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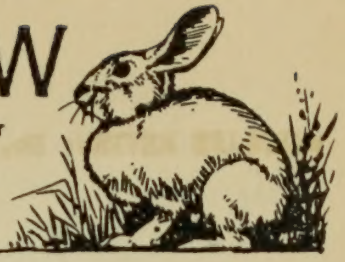
WILDLIFE REVIEW



AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE
BUREAU OF BIOLOGICAL SURVEY
UNITED STATES DEPARTMENT OF AGRICULTURE

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Washington, D. C. No. 18

SUBJECT INDEX FOR WILDLIFE REVIEW
Nos. 8-17, April 1937 - December 1938

The classification used in the index is primarily from the wildlife management point of view, major headings being much the same as have been regularly used in WILDLIFE REVIEW. Subordinate grouping depends usually on the key word, which may be preceded by a preposition, article, or other trivial term. Federal agencies are arranged alphabetically under U. S. Government.

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8	April 1937	110	103	--	3	14
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16	November 1938	119	111	--	--	3
17	December 1938 (January 1939)	103	114	--	--	--
Totals		915	588*	7*	5	51

* Duplications deducted

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WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE
BUREAU OF BIOLOGICAL SURVEY
UNITED STATES DEPARTMENT OF AGRICULTURE

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Delay in issuing WILDLIFE REVIEW has been due mainly to a thorough process of revision of the mailing list. Material is ready for 3 numbers which it is planned to distribute in prompt succession.

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Bibliography: Wildlife management in relation to soil conservation

Gaines, Stanley H., et al. Bibliography on soil erosion and soil and water conservation, U. S. Dept. Agriculture Miscellaneous Publ. 312 (Supt. of Documents, Washington, D. C., 60 cents a copy), iv+651 pp., October (November) 1938.

The section on "Wildlife management as related to soil conservation" runs from page 544 to 559.

Biological Survey: Annual Report, 1937-38

Gabrielson, Ira N. Report of the Chief of the Bureau of Biological Survey, 1938 (Supt. of Documents, Washington, D. C., 10 cents a copy), 68 pp., 8 tables.

This is the only publication in which there is available a general account of the work of the Biological Survey. The material is arranged mostly, but not entirely, along Divisional lines under the following main headings: Research on wildlife status and management, Economic research on wildlife, Research in fur-animal conservation and utilization, Wildlife-disease control, Federal aid in wildlife restoration, Acquisition of lands for refuges, Restoration of wildlife habitat by the refuge program, Administration of national wildlife refuges, Administration of wildlife-conservation laws, Importation and other permits issued, Cooperative control of injurious animals, Control methods research, Wildlife conservation in Alaska.

Some points probably of especial interest to readers of WILDLIFE REVIEW are: Completion of a research laboratory at the Wichita Mountains (Oklahoma) Wildlife Refuge, and the beginning there of a full program of study of the relations of wildlife to forest and range; completion of a survey in all the States of game management as a supplementary farm enterprise; establishment of 5 new wildlife refuges and putting 17 under administration for the first time; organization of a division to put into effect legislation for Federal aid in wildlife restoration. Wildlife students will want to read for themselves, however, sections of the report in which they may be specially interested. It is fortunate that the pamphlet can be obtained from the Superintendent of Documents as the number of copies available for distribution by the Biological Survey is limited by law to 2,500 copies, a supply that is soon exhausted.

Biological Survey: Federal Aid Act

Day, Albert M. Operation of Federal Aid Act explained, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 27(4), July-August 1938, pp. 68-69.

Provisions of the Federal Aid to Wildlife Restoration Act explained. Types of projects likely to receive approval include: (1) The purchase of land for wildlife-rehabilitation purposes; (2) the development of land to make it more suitable for wild mammals and birds; and (3) research projects set up on a definite basis and directed to the solution of problems that stand in

the way of wildlife restoration. Examples of satisfactory projects are cited. Misconceptions of the intentions of the Biological Survey that have appeared are: That it wishes to restrict expenditure of funds to development of waterfowl areas; that it favors an exclusively refuge program; that regulations will be so strict that funds cannot be used, hence will revert to the use of the Federal government; and that the Bureau will insidiously attempt to take over the control and management of all resident game. Naturally these gossipy inventions are all disavowed.

Biological Surveys: Mammals of Commander Islands

Barabash-Nikiforov, I. Mammals of the Commander Islands and the surrounding sea, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas, $1.00 a copy), 19(4), Nov. 1938, pp. 423-429.

Description of natural conditions; annotated list of 18 forms mostly seal allies and cetaceans (exclusive of Delphinidae). Bibliography of 8 titles. Of most interest to wildlife managers for the account of the arctic fox. This includes information on general habits, food, moult, reproduction, dens, enemies, diseases, and parasites. The chief food is made up of marine forms, living and dead obtained along the shore, to which is added a considerable take (39 percent) of birds, a few insects, berries and other vegetation, and garbage.

Biological Surveys: Mammals of Labrador

Jackson, C. F. Notes on the mammals of southern Labrador, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas, $1.00 a copy), 19(4), Nov. 1938, pp. 429-434.

Review of literature, of which 9 titles are cited; annotated list of 18 forms.

Biological Surveys: Mammals of Vermont

Osgood, Frederick L., Jr. The mammals of Vermont, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas, $1.00 a copy), 19(4), Nov. 1938, pp. 435-441.

Annotated list of 61 forms; bibliography of 13 titles.

Conservation

Glover, Katherine. America begins again (McGraw-Hill Book Co., Inc. New York, N. Y., $2.75 a copy), 382 pp., illus., 1939.

The account of waste in our natural resources is described in the introduction by Stuart Chase as "making me pretty angry"; the book not only summarizes devastation of the country but tells what is now being done to make up for it. Chapter VI (pp. 203-229, 14 illus.) is devoted to wildlife. The original abundance of wildlife and its decline under persecution and destruction of environment are stated. Some money values of wildlife and specific

instances of usefulness are cited. The conservation movement is traced down to its most recent manifestations--the migratory waterfowl refuge, and Federal aid to the States, programs. The use of relief organizations and the cooperative effect of the work of various Federal bureaus is commented upon. Management, especially of farm game, and research are given attention and the encouraging results of restoration activities are sketched.

Conservation

Hamilton, W. J., Jr. Conservation of wildlife, Chapter III, pp. 261-345, figs. 154-193, in Gustafson, A. F., et al., Conservation in the United States (Comstock Publishing Co., 124 Roberts Place, Ithaca, N. Y., $3.00 a copy), 445 pp., frontispiece (cartoon) + 232 figs., 1939.

The book is a general work on conservation (soil, water, minerals, organisms) by 4 authors. Pertinent to WILDLIFE REVIEW are the chapters on Game and Fur Resources, and on Conservation of other Useful Wildlife; Hamilton's section includes also a chapter on fish and fisheries. In a work of so wide a scope treatment must be summary, hence striking facts and figures prevail. Values are given in estimates of yields and financial returns, but the esthetic side is by no means neglected. Accounts of the past abundance and general decline of wildlife inevitable to the review, as inevitably contain many superlative expressions. The present status of wildlife is realistically treated and the mechanism of conservation is described. Fur farming, game propagation and management, and the farmer's role in conservation also receive attention. Each of the chapters is accompanied by a set of questions.

Conservation

Murphy, Robert Cushman. Conservation II, Garden Club of America Bul. (1615 Twenty-first St., Washington, D. C.), 6(7), Jan. 1938, pp. 39-50; 6(8), March 1938, pp. 26-36.

Part of the text is of special interest to biologists; this abstract avoids, however, material substantially quoted from other sources. The author takes as an encouraging sign the tendency "to recognize the validity of information derived from the researches of naturalists," and urges that biologists be consulted in connection with the planning of all great landscape altering projects.

He refers to the primitive balanced condition of nature in which "Each organism, plant and animal, had its proper place in the scheme of things, and," he adds, "I want particularly to call your attention to the fact that predatory creatures, such as wolves, foxes, weasels, hawks, owls, and whatever else a large proportion of our modern population chooses to call 'vermin,' mostly existed in infinitely greater numbers than at present, and yet absolutely without prejudice to the welfare and increase of other species which we choose to call game." "I x x x have no sympathy with the point of view that lumps as 'vermin' all animals which sometimes kill other animals that man himself may want to kill. The raptorial birds have an indispensable function as members of a healthy fauna. The same is true of the carnivorous mammals. Both are part of the desirable balance of nature. Their blacklisting results largely from the

attitude of gamekeepers or fish-culturists, who have charge of helpless prey in pens or hatcheries where the density is quite unnatural. The shameful destruction of hawks and owls grows constantly with the spread of firearms, in spite of the accumulating testimony of science that most of them represent a net benefit both to crops and to game."

The author calls attention to the incorrigibility of hunters and editors of sporting journals in clinging to views on raptors based on slight experience, regardless of the findings of men who are using their time, talents, and education for no other purpose than to learn the truth.

Comment is included on the destructive and protective phases of American wildlife conservation and upon the promise shown by wildlife management through environmental improvement. Not only has the destruction of wildlife been great but "a great deal of it need never have occurred. We know now that the loss of wildlife, including flowers, birds, fish, fur-bearers and game, has been largely unnecessary. Many more of all these might still be thriving on land in economic use, and others could be accommodated on land not needed for economic use. One of the present educational jobs for the benefit of the entire populace is to induce landowners to keep the largest possible areas habitable for as many species of wildlife as they can." Game should be treated as a crop but to be successful in this, attention to maintenance of the stock should never be neglected because of greater interest in the harvest.

Conservation

Murphy, Robert Cushman. Conservation III, Garden Club of America Bul. (1615 Twenty-first St., Washington, D. C.), 6(12), Nov. 1938, pp. 34-48.

Nearly everyone agrees as to the desirability of conservation but few grasp the difficulties of the subject involving, as it does, almost infinite ecological relationships. "The one possible solution for a healthy condition is a recovery of the closest approximation of the original balance consistent with the exigencies of a human population that appears to be rapidly approaching its maximum density." The balance of nature is misunderstood, if not questioned, for lack of understanding of its fluctuating character. This is illustrated by discussion of the behavior of cyclic populations. The problem of wildlife management is adjustment to such natural rhythms. The difficulties of achieving adjustment are mostly human. The possible general establishment of tolerably balanced conditions in the United States is contrasted with the local maintenance of an artificial balance on British private estates. This, the writer feels, is so lopsided that it would not be tolerated in our country.

The author again comments on predaceous creatures, the presence of which in abundance is no threat to the continued prosperity of their prey, and supports the contention by various instances. Control operations interfere with the functioning of natural balance and experience has taught "that it is not so simple as we once thought to classify native animals into desirable and undesirable categories; even the so-called vermin have their place, and a natural balance of the original wildlife on uncultivated land is the soundest aim. x x x Local and needful control is wise control, but it offers no justification for bounty systems, trumped-up crow shoots, or the widespread distribution of poisoned bait."

Conservation: Bibliography

Hurley, Richard J. Key to the out-of-doors (H. W. Wilson Co., 950-72 University Ave., New York, N. Y., $2.50 a copy), 256 pp., 1938.

The subtitle is "A bibliography of nature books and materials." It includes references to publications issued or reissued since 1920 that apply chiefly to America, omitting technical, "ethical, philosophical, fictionized, and emotional elements except a few 'classics.'" Emphasis is on conservation and "hunting" material has been avoided. Pages devoted to citations on vertebrates extend from 105 to 163. There are references also to magazines, to sources of pictures and lantern slides and to devices and supplies, and to other nature bibliographies. Addresses of sources of film materials and of publishers fill pages 217 to 233.

Conservation: Bighorn

Carhart, Arthur H. Goodbye bighorn, Rocky Mountain Sportsman (1636 Champa St., Denver, Colo., 15 cents a copy), 1(3), Aug. 1938, pp. 12-13, 27-28, 4 photos, 1 map, 1 table. Digest in Conservation (919-17th St., Washington, D. C., 20 cents a copy), 4(5), Sept.-Oct. 1938, pp. 5-8.

The bighorn formerly used the foothills for winter range but is now largely restricted to higher elevations the year round. This unnatural and hazardous life together with competition and infections from sheep threaten its extermination. [That the bighorn succumbs to diseases of domesticated sheep is a plausible theory but that it does so to any significant extent seems not as yet, however, supported by satisfactory evidence.] A table giving numbers of bighorn and domestic sheep on the national forests of Colorado from 1914 to 1937 shows decrease in the former, increase in the latter, both considerable. The author's suggestion for a remedy is refuges for bighorns including adequate winter range from which livestock shall be excluded.

Conservation: Bighorn

Shantz, H. L. The bighorn and national forests, Conservation (919-17th St., N. W., Washington, D. C., 20 cents a copy), 5(1), Jan.-Feb. 1939, pp. 34-36.

Bighorns are steadily declining in numbers on the national forests, the proportion being 18 percent or more since 1921. Opinions as to the causes and remedies are discussed. Little seems to be definitely known and search for logical management procedure is advised. The article is a reply to one by Arthur H. Carhart, condensed in the September-October (4(5)) issue of Conservation, pp. 5-8. For abstract of that author's original paper see above.

Conservation: CCC in

Anon. The CCC and wildlife, Civilian Conservation Corps (Washington, D. C.), 16 pp., illus., 1 table, March 1939.

This well-illustrated pamphlet pictures somewhat luridly the primitive abundance of wildlife on the American continent, sketches its decline, and summarizes belatedly adopted protective measures. Despite efforts at conservation, "By 1933 the big-game situation was bad enough but could have been worse; the wildfowl situation was desperate." Drainage and desiccation added to the difficulties. In 1934 "there developed a concerted demand for federal action" to conserve the waterfowl. Some of the funds appropriated for submarginal land retirement and drought relief were allotted for wildlife restoration, enabling the Biological Survey to develop its refuge program.

The opportune organization of the Civilian Conservation Corps provided an agency that greatly extended the possibilities in water impoundment, establishment of food and cover plantings, collection of propagating material for current and future use, rescue of wild fowl affected by botulism, construction of nesting islands, and of protective fencing, roads, buildings, and other administrative facilities. In 5 years the CCC did such work on 46 refuges.

CCC work on national forests has included improvement of browse and cover conditions and winter feeding of wildlife. Cooperation with the Soil Conservation Service, the Tennessee Valley Authority, and the National Park Service and other Federal organizations also has been directed in part toward benefiting wildlife. The interests of the various agencies concerned were integrated so far as practicable. The CCC has had more than 2,000,000 men, mostly youths, in its camps, and due to their training, they represent a mass of informed public opinion on wildlife such as we have never before had. They are conscious of the value of wildlife as a national asset because they have helped to restore, preserve, and protect it. A table shows work of 40 classes done in 5 years by Biological Survey camps and by all camps.

Conservation: "Ducks Unlimited" in relation to

Lumley, Ellsworth D. Ducks unlimited, The Seattle Wren (L. Roy Hastings, 4442 48th Ave., S. W., Seattle, Wash.), 7(1), Jan. 1939, pp. 1-4.

The author refers to the campaign of Ducks Unlimited for funds in Washington State. Such funds with others collected are to be used to improve wild fowl breeding grounds in Canada. By such improvement, production of waterfowl is to be greatly increased and the duck shooters are promised longer hunting seasons, larger bag limits, and the removal of petty regulations. The author quotes authorities to show that the shortage is in ducks rather than in breeding grounds, there being not enough fowl to occupy the nesting areas already available. Lumley concludes that the activities of Ducks Unlimited are "a menace to the future welfare of the ducks." He quotes the head of the D. U. press bureau as opposing creation of a waterfowl refuge at Merrymeeting Bay, Maine, and promising cooperation with local interests in opposing the establishment of sanctuaries elsewhere. The author summarizes in part: "Only one conclusion can be drawn from a careful study of the facts. Ducks Unlimited is organized as a pressure group to defeat any conservation move in the United States which would save the ducks from hunters' guns."

Conservation: On an ecological basis

Lascelles, Tony. Save our wildlife! Now or never, Forest & Outdoors (610 Canada Cement Bldg., Montreal, Canada), 34(10), Oct. 1938, pp. 294, 296.

Do "game departments realize the existence of an association of life with its environment, the dovetailing x x x of every feature of the wilderness x x x the necessity of a scientific knowledge x x x the science of ecology." The inordinate destruction of red squirrels for their pelts is no aid to the recovery of the marten, nor does it help carnivorous fur-bearers in general to permit uncontrolled slaughter of varying hares. Destruction of beavers has damaged woodlands and the environment of other water-loving animals. Predators have a place in nature and their indiscriminate control is detrimental. The introduction of exotic game birds hampers the restoration of native species. Present hit-or-miss, uninformed methods should be abandoned in favor of those based on understanding of the interdependences of wildlife.

Conservation: Grouse, Sage

Girard, George L. Sage grouse and the State's conservation program, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 66-67.

Notes on habits and food of the species in Wyoming and suggestions for its protection, including refuges, essential qualifications of which are mentioned. The sage grouse has alarmingly decreased in Idaho in a period of 20 years and is doomed to extinction unless greater consideration is given to it.

Conservation: House of Representatives Committee report

Anon. Report of the Select Committee on Conservation of Wildlife Resources, House of Representatives, 76th Congress, 1st Session, House Report No. 1 (House Office Bldg., Washington, D. C.), 29 pp., 1939.

This report contains a general statement on the value of wildlife. Contributions from the respective organizations on recent accomplishments, plans, and needs of the Biological Survey, Bureau of Fisheries, Forest Service, National Park Service, and Soil Conservation Service; remarks on related work of the Bureau of Agricultural Economics, Civilian Conservation Corps; discussion by the Committee of the migratory waterfowl situation, the Federal shooting regulations, Federal aid to States in wildlife restoration, stream pollution, protection of fur bearers, and the need for education in conservation together with recommendations of the Committee.

Conservation: Illinois

Frison, Theodore H. Advances in the renewable natural resources program of Illinois, Illinois State Acad. Sci. Trans., 31(1), Sept. 1938, pp. 19-34, 10 figs. Reprinted for the State Natural History Survey, Urbana.

Section headings indicating the nature of the contents are: Early and present attitudes toward natural resources, Background of the conservation and restoration program, Extent of renewable natural resources, Recent advances in

conservation, including game research and management, and Experimental wildlife areas. A map shows the location of forest, game, and fish development projects in Illinois.

Conservation: Mustelids

Marshall, William H. Notes on fur-bearers, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 82-83, 1 table.

Relates to mustelids, giving their economic value, their estimated numbers on national forests in western States, the causes of their depletion (mainly trapping), and suggestions for their restoration and protection.

Conservation: Wildlife on farms

Gabrielson, Ira N. Farmer conservationists, Land Policy Review (Supt. of Documents, Washington, D. C., 5 cents a copy), 2(1), Jan.-Feb. 1939, pp. 12-15.

More than half of the land area of the United States is in private farms and including that, about 85 percent is devoted to agricultural uses. Hence the future of wildlife depends a great deal on the treatment accorded it by farmers. For the kinds of animals involved, all that governments can do toward their conservation is of minor importance. Farmers as a rule are favorably interested in wildlife and already have done a great deal to preserve it. Farmer-sportsman relationships are discussed; the farmer has been guided chiefly by social, not financial, considerations; and the outlook for any considerable money return in exchange for hunting privileges is not very promising. Real game management on farms usually is impracticable and artificial propagation too costly. The encouragement of natural reproduction by simple modifications of farm practices is feasible and farmers are interested in it. They like wildlife and wish to favor it. They constitute the largest and most important group of conservationists.

Conservation: Wildlife and other renewable resources

Taylor, Walter P. Conservation in Texas wildlife, Southwestern Sports Magazine (214-16 N. 6th St., Waco, Texas, 15 cents a copy), 2(3), Nov. 1938, pp. 14-15, 23, 3 photos.

All is not well with the so-called renewable natural resources. Detrimental influences and their results on wildlife are summarized in 10 significant indictments. The author believes that public sentiment is now receptive to conservation doctrine and that by management, a gratifying degree of restoration may be effected. Achievements are cited and cooperation with nature based on research recommended for their multiplication. All that needs to be done can be accomplished by the existing social organization but earnest attention is required and the program of conserving our natural resources must be solved if we are to survive.

Conservation: Wildlife in the Southwest

Ligon, J. Stokley. Wildlife and modern land-use policies in the Southwest, Cattleman (Coliseum Bldg., Stock Yards, Fort Worth, Texas), 25(6), Nov. 1938, pp. 45-48.

The writer's conviction, which he thinks is shared by many nowadays, is that crops and livestock should not be favored to the exclusion of wildlife. Although vegetation should be maintained at as near a normal stage as possible, commensurate with economic land use, the fact is that in the Southwest much of the range has been so denuded that it can be put to no profitable use. It must be restored and the author points out that, "Conditions favorable for sustained and most profitable livestock grazing supply the two major essentials--protective covering and source of foods--for game and insectivorous birds. Without restoration of forage where it has been seriously impaired or destroyed, or without conservative utilization of such forage where it does exist, neither livestock nor game can be expected continuously to thrive. x x x What is best for domestic animals is likewise best for wildlife." While the author recognizes that exotic game birds will live in environments unsuited to native species, he urges that the latter be protected and encouraged as much as possible. He relies on the cooperation of ranchmen because they have done much to save the wildlife of the Southwest, preserving it on their private holdings, while on public lands it was practically destroyed. Suggestions for game management in the range country are given.

Control: Bird and rodent damage to seedlings

Krauch, Hermann. Does screening of seed spots do more than protect the spots against rodents and birds?, Southwestern Forest and Range Expt. Sta. (Tucson, Ariz.), Note 49, 4 pp. (mimeographed), Dec. 1938.

1-year seedlings under screens continuously showed higher survival than those from which screens had been removed after a few months. The effects of screening will be further investigated but the suggestion to the abstracter is, if the operation pays for itself, it may be regarded as a horticultural practice and so lift part of the blame from the mammals and birds against which it is now used as a defense.

Control: Pine seed destruction by birds

Chapman, H. H. Birds and longleaf pine reproduction, Journ. Forestry (Mills Bldg., Washington, D.C., 50 cents a copy), 36(12), December 1938, pp. 1246-1247.

Refers to Burleigh's paper (see WILDLIFE REVIEW, No. 16, November 1938, pp. 19-20) which concludes that pine seeds in years of heavy yield are mostly eaten by the numerous birds they attract, and that consequently best survival can be expected from light yields. Chapman, however, states: "In the reviewer's experience in La Salle Parish, La., the heaviest reproduction was established in years of correspondingly heavy seed crops. The preference of blackbirds for freshly burned areas was demonstrated by the complete denudation of an experimental area in 1928, which had been burned before the seed fell.

This same area, in 1936, was successfully reproduced in a heavy seed year. The presence of an accumulation of three or more years' rough progressively inhibits germination, but this occurs plentifully in a rough composed of growth of one or two summers' grass. This rough evidently offers the necessary protection to the seeds against blackbirds. By burning the land over in the winter previous to seed fall, it is probable that bird damage can be successfully controlled."

Control: Predatory birds

Willett, G. Control of predatory birds, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 9(2), Feb. 1939, pp. 12-13.

In view of the interest of different groups in birds, "Game breeders x x x should confine control measures to birds actually known to be doing damage." Discussion of hawks with suggestions as to recognition of the principal species. Briefer reference to owls, crows, ravens, jays, and the roadrunner. Birds display individuality, and control should not be general but restricted to those that have acquired destructive habits.

Control: Rodents on the range

Bond, Richard M., and Adrey E.Borell. Rodents and soil conservation, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 220-223.

Opposed views on the relation of rodents to the range are summarized. "As usual the demand for action has preceded the provision for research." Investigation has been needed badly for years but the number of scientific reports on just what rodents do to land may be numbered on the fingers of one hand. The more profound investigations have turned up bits of information favorable to the rodents; these are cited. Van Dersal's conclusions from examination of the literature on the relation of rodents to soils are quoted. (These may be found in WILDLIFE REVIEW, No. 9, July 1937, p. 11.) The relation of rodents to earthen water-controlling structures is conflicting. In fact what seems most clear is that these animals do both good and harm and that much study is needed of their relations to soil and water conservation. Suggestions are given as to the subjects and methods of such investigations. Until the work is actually effected, "caution in the expenditure of soil-conservation funds for rodent control is definitely indicated."

Control: Roving dogs

Egbert, George L. The coyote and his bad name, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(7), March 1939, p. 5.

A special effort to reduce the number of roving dogs in Iosco County, Mich., resulted in the elimination of more than 80 animals and in addition greatly improved collection of dog license fees. Since this purge there has been a marked decline in depredations on sheep, which, formerly, were attributed almost entirely to coyotes. The conclusion is "that snap judgments should not be made for or against any species of predatory wildlife, for while [the coyote

is] known to attack both deer and sheep at times, it is also known that its marauding forays are occasionally exceeded in ferocity and destructiveness by the hunting dog, which sometimes escapes both blame and punishment."

Control: Squirrel damage to tree tags

Stevenson, Donald D. Squirrel damage to sample plot tags, Journ. Forestry (Mills Bldg., Washington, D. C., 50 cents a copy), 36(12), Dec. 1938, pp. 1242-1243.

As many as one-quarter of the aluminum tags used to mark trees in permanent plantations in central Pennsylvania have been destroyed by squirrels. The author recommends painting of the numbers on a blaze wherever the squirrel population is high.

Cycles: Arctic animals

Chitty, Dennis. Canadian Arctic wild life enquiry, 1936-37, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, London, N. W. 1, England, 20 shillings a copy), 7(2), Nov. 1938, pp. 381-394, 3 figs. (maps), 2 tables.

The second report on a questionnaire inquiry into population trends of lemmings, arctic fox, and snowy owl. "In the Eastern Arctic there was considerable increase reported in arctic foxes, especially on Baffin Island and the coast of Northern Quebec. Lemmings and snowy owls, which had begun to recover from scarcity in the previous season, showed further well-marked increase in the same region, and also to some extent elsewhere. In the Western Arctic there were very few signs of such recovery among any of the species studied." The basic data is both tabulated and mapped. Notes on disease among sledge dogs also are quoted and summarized.

Cycles: Grouse

Erickson, A. B. Grouse observations, The Flicker (427 Eighth Ave., S. E., Minneapolis, Minn.), 10(3-4), Dec. 1938, p. 14.

Observations in St. Croix Park, Pine County, Minn., indicate that the die-off in ruffed and sharp-tailed grouse occurred in the fall and winter of 1935-36. Notes are given on populations for 1935, 1936, and 1937.

Cycles: Northern animals

Dymond, J. R. The study of animal populations, Rod and Gun in Canada (1324 St. Catherine St., West, Montreal, Canada, 10 cents a copy), 40(10), March 1939, pp. 17-18, 26-27, 2 photos.

Rather popular discussion of cyclic phenomena in the snowshoe hare and lemmings and dependent predators. References also to fluctuations in ruffed and sharp-tailed grouse. The point is emphasized that peaks of abundance do not always occur in the same year in all parts of the country--a happening that throws considerable doubt on the sun-spot theory. The writer makes some salu-

tary remarks also on the dependency of predator numbers on the populations of their prey. "A point worth emphasizing in connection with the fluctuations of hare numbers is that it is not the 'enemies' of hares which cause their scarcity; the reproductive capacity of hares and other animals is adequate to maintain and even increase their numbers in the presence of the predators which normally prey on them. It is the prey, in this case the hares, which determine the numbers of their predators. Predators do affect to some extent the numbers of their prey but the initiative lies with the prey."

Much the same material is printed in Royal Ontario Museum of Zoology (Toronto, Canada) Bul. 8, November 1938, pp. 11-16.

Cycles: Snowshoe hare

Philip, Cornelius B. A parasitological reconnaissance in Alaska with particular reference to varying hares. I. Some biological considerations, Journ. Mammalogy (Wm. B. Davis, College Station, Texas, $1.00 a copy), 20(1), Feb. 1939, pp. 82-86, 1 table.

Biological data are recorded in the text as well as summarized in a table relative to sex, number of young, and parasites of 172 hares. The cyclic die-off does not necessarily occur simultaneously over the whole territory. Tularemia was identified in the animals but possible vectors of this disease do not appear numerous enough to enable it to be an important factor in hare decimation. Bibliography of 12 titles.

Destruction: Highway

Scott, Thos. G. Wildlife mortality on Iowa highways, American Midland Naturalist (Notre Dame, Ind., $1.00 a copy), 20(3), Nov. 1938, pp. 527-539, 5 tables.

Casualties and the mileage record for each were noted on improved rural roads during all months in 43 counties. The number was 1,239 in 2,944 miles or approximately .429 per mile. Total for the State on roads of the type inspected probably exceed 160,000. Factors influencing mortality are discussed, and the data gathered for the paper are presented in annotated lists and distributed in the tables.

Destruction: Highway

Simmons, James R. Feathers and fur on the turnpike, Christopher Publishing House (Boston, Mass., $1.75 a copy), 148 pp., 10 pls., 3 figs., 4 tables, 1938.

1. A study of wildlife casualties on the highway, pp. 9-10, 13-93. Chiefly anecdotal account of animals and experiences with them connected with the author's 10-year study undertaken partially to salvage highway-killed wildlife for scientific purposes. Tables list the specimens noted, classified by species and so far as practicable, as immature, male, and female--groups killed in frequency in the order given; also in similar detail the animals killed on 2 particular stretches of road in a year; the results tally very closely, being 8.5 and 8.0 victims per mile per year and .023 and .0219 per

mile per day. At that rate total destruction in the United States would be about 6 million vertebrates [this word misspelled throughout the book]. The casualty curve for these roads is rather steep-sided and reaches its apex in August. In the tabulation of all animals recovered, the following were killed in greatest numbers: Robin 375, English sparrow, 351, cottontail, 337, field sparrow, 296, and skunk, 222. There is a partial review of contemporary studies of highway mortality, a discussion of why animals come to the road, and suggestions as to what can be done to reduce destruction. Among these are providing grit and dust areas near, but not too near, roads; refraining from throwing remains of lunches and other edible refuse on or along highways; erecting signs calling attention to deer crossings, installing escape-ways, and undertaking corrective education. A chapter is devoted to cats, many of which are killed by automobiles; his remarks on their food habits are not so condemnatory as those prevalent among sportsmen.

Destruction: Winter killing

Errington, Paul L. The comparative ability of the bobwhite and the ring-necked pheasant to withstand cold and hunger, Wilson Bul. (University of Michigan, Ann Arbor, Mich., 60 cents a copy), 51(1), March 1939, pp. 22-37, 7 tables.

Summary of observational and experimental data. Bibliography of 20 titles. From the author's discussion: "It is apparent from the existing experimental and observational data that winter food crises do not have the malignant significance to wintering pheasants that they may have to bob-whites in north-central states. Not only does the ring-necked pheasant have superior ability to withstand cold when in poor flesh, but it is much less likely to become emaciated from hunger in the first place. Its loss rates are less rapid in proportion to its weight even while starving, and there is evidence that it can retard starvation during crises by feeding upon buds and other herbaceous foods that are not of comparable nutritive value to bobwhite x x x The pheasant's greater strength is of distinct advantage to it if the food is covered by snow or ice; and its greater mobility and comparative independence of brushy cover takes much of the pinch out of many local food shortages. Furthermore, the facility with which it regains lost weight when opportunity permits is probably a major reason for the fewness of authentic records of pheasant starvation in the field.

"I am by no means advocating the replacement of the native northern bob-white by the exotic ring-necked pheasant. There are biological, economic, and esthetic angles to questions pertaining to the desirability of encouraging pheasants and bob-whites that are not here considered; but, whatever may be the ramifications or controversial aspects of these, it should be useful to conservation workers merely to have a clearer idea of how much better the pheasant is adapted to forage for a living when the ground is covered with snow and to appreciate more the significance of a uniformly reliable food supply to wintering bob-white populations."

Diseases and Parasites: Alaskan vertebrate parasites

Philip, Cornelius B. A parasitological reconnaissance in Alaska with particular reference to varying hares. II. Parasitological data, Journ. Parasitology (Science Press, Lancaster, Pa.), 24(6), Dec. 1938, pp. 483-488, 2 tables.

Tapeworms, nematodes, ticks, fleas, and mites tabulated according to localities and numbers of specimens. Notes on pathology of hares examined. Both endo- and ecto-parasites collected from 9 other species of mammals and 6 of birds are listed. Bibliography of 6 titles.

Diseases and Parasites: Of American mice

Erickson, Arnold B. Parasites of some Minnesota Cricetidae and Zapodidae, and a host catalogue of helminth parasites of native American mice, American Midland Naturalist (Notre Dame, Ind., $1.00 a copy), 20(3), Nov. 1938, pp. 575-589, 18 figs.

Summary of the history of study of American helminth parasites of mice, report on Minnesota studies including descriptions of 2 new species from Zapus and 3 from Peromyscus; host catalogue as noted in title; bibliography of 21 titles.

Diseases and Parasites: Avian tuberculosis

Feldman, Wm. H. Avian tuberculosis infections (Williams & Wilkins Co., Baltimore, Md., $7.00 a copy), 483 pp., 109 figs., 1938.

An introductory sketch by another author refers to this book as a monograph and it seems well to deserve that distinction. It contains 13 chapters of which two are of special interest to the student of wildlife diseases. These discuss the pathogenicity of avian tuberculosis bacilli for fowl other than chickens (including wild birds) and for certain mammals other than man. The organism seems to be capable of infecting all species of birds, but is infrequently reported. Various mammals are, or can be, infected but the group shows considerable resistance to this disease. Like other chapters of the book, those particularly cited are accompanied by specific bibliographies.

Diseases and Parasites: Botulism

Hall, I. C., and G. W. Stiles. An outbreak of botulism in captive mink on a fur farm in Colorado, Jour. Bacteriology (Williams & Wilkins Co., Baltimore, Md.), 36(3), March 1938, p. 282.

The death of 146 of 148 mink on a fur farm near Denver is shown to have been caused by the toxin of Bacillus botulinus type A. This appears to be the first recorded instance of naturally occurring botulism in mink or other fur-bearing animals. (Courtesy Experiment Station Record)

Diseases and Parasites: Botulism, lead poisoning

Fredine, Gordon, and J. Frederick Bell. Ducks get sick too, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 63, Dec. 1938, pp. 16-17, 24, 34, 4 photos.

Popular account of botulism and lead poisoning in Minnesota. More than 3,000 ducks perished from the former malady at Lake Shaokotan in the early fall of 1938. A variety of measures (described) to keep wild fowl away from the danger area apparently were highly successful. Out of 814 sick ducks treated, 774 recovered and were released in uninfected lakes. In 1936 ducks frequented a small open hole in the ice at Bear Lake where they obtained enough lead pellets to cause the death of several hundreds of them from lead poisoning. Treatment was unavailing. The possibility of using non-toxic shot is discussed.

Diseases and Parasites: Chastek paralysis

Green, R. G. Chastek paralysis, Amer. Fur Breeder (St. Peter, Minn., 15 cents a copy), 11(1), Jan. 1938, pp. 4, 6, 8.

A type of paralysis which has frequently been observed among foxes in recent years is described. This disorder is apparently due to a deficiency of vitamin B_1 in the diet and has generally occurred when the diet contained a rather high percentage of fresh fish. A common type of ration containing about 7 percent of fresh fish and 7 percent of liver was fed with good results, while a similar type of ration containing 18 percent of fresh fish and 2 percent of liver resulted in a severe outbreak of the paralysis. This disorder has not been observed when cooked fish were fed. (Courtesy Experiment Station Record)

Diseases and Parasites: Cochlosoma

Travis, Bernard V. A synopsis of the flagellate genus Cochlosoma Kotlan, with the description of two new species, Journ. Parasitology (Science Press, Lancaster, Pa.), 24(4), August 1938, pp. 343-351, 11 figs.

History; generic diagnosis; systematic position; economic status. Description, measurements, and illustrations of 3 species: C. anatis Kotlan from various species of ducks; C. picae n. sp. from the American magpie (Idaho); and C. turdi n. sp. from the robin (Iowa). Comparative notes, summary, and bibliography of 4 titles.

Diseases and Parasites: Dracunculus

Brackett, Sterling. Description and life history of the nematode Dracunculus opidensis n. sp., with a redescription of the genus, Journ. Parasitology (Science Press, Lancaster, Pa.), 24(4), Aug. 1938, pp. 353-361, 8 figs.

From garter snakes, Michigan; description, measurements, illustrations, comparative remarks, life cycle. Emendation of the generic diagnosis. Bibliography of 6 titles.

Diseases and Parasites: Eimeria

Boughton, Donald C., and Joseph J. Volk. Avian hosts of Eimerian coccidia, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass., 75 cents a copy), 9(3), July 1938, pp. 139-153, 1 fig.

Eimerian coccidiosis is described and its occurrence among birds discussed. There is a host list giving the species of Eimeria known from various birds (37 spp.), a descriptive catalog of the parasites (34 spp.), and a 2-page bibliography.

Diseases and Parasites: Encephalomyelitis

Tyzzer, Ernest E., Andrew W. Sellards, and Byron L. Bennett. The occurrence in nature of "equine encephalomyelitis" in the ring-necked pheasant, Science (Lancaster, Pa., 15 cents a copy), 88(2291), Nov. 25, 1938, pp. 505-506.

This disease identified by laboratory procedure in pheasants from Connecticut. The susceptibility of other birds both wild and domesticated is noted. Symptoms and lesions are described. The authors consider the adjective "equine" objectionable for this evidently widespread disorder is of no greater prevalence in horses, perhaps, than in other animals. It is suggested that the disease may be spread by migratory birds.

Diseases and Parasites: Enteritis in raccoon

McDermid, A. M. Infectious gastro-enteritis in raccoon, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(3), March 1939, pp. 21-22.

An acute virus disease observed on 5 fur farms in Wisconsin. Symptoms are described. In most cases the primary infection seemed traceable to cats. Good results have been obtained from treatment with commercial feline enteritis serum. Symptomatic treatment also is described.

Diseases and Parasites: Flukes in ducks

Beaudette, F. R. Flukes in the respiratory tract of ducks, Journ. Amer. Veterinary Assoc. (221 N. La Salle St., Chicago, Ill., 40 cents a copy), N.S. 47(1), Jan. 1939, p. 44.

Records of flukes, acanthocephalids, and nematodes from mallards in New Jersey. The flukes are identified as Tyrhlocoelum cymbium, a species previously recorded from the pintail and the pied-billed grebe.

Diseases and Parasites: Flukes in turtles

Byrd, Elon E. Studies on the blood flukes of the family Spirorchidae. Part II. Revision of the family and description of new species, Reelfoot Lake Biol. Sta. Rep. (Tennessee Academy of Science, Nashville, Tenn.), 3, Jan. 1939, pp. 116-161, 4 pls., 1 fig.

Historical and systematic review with keys and descriptions of genera and species (9 new) of this family of turtle parasites. The figure is a phylogenetic "tree" and the plates are of drawings illustrating the new species. Bibliography of 24 titles.

Diseases and Parasites: Fowl paralysis (?) in pheasants

Jungherr, Erwin. Neurolymphomatosis phasianorum, Journ. Amer. Veterinary Assoc. (221 N. La Salle St., Chicago, Ill., 40 cents a copy), N.S. 47(1), Jan. 1939, pp. 49-52, 5 figs.

Outbreak of a disease in 4-months' old pheasants (Phasianus torquatus) that resembles fowl paralysis. Symptoms discussed and lesions described and illustrated.

Diseases and Parasites: Isospora boughtoni n. sp.

Volk, Joseph J. Isospora boughtoni n. sp. from the American opossum, Didelphis virginiana, Journ. Parasitology (Science Press, Lancaster, Pa.), 24(6), Dec. 1938, pp. 547-548, 1 fig.

Coccidian from Georgia described and illustrated.

Diseases and Parasites: Leucocytozoon synonymy

Herman, Carlton M. Leucocytozoon anatis Wickware, a synonym for L. simondi Mathis and Leger, Journ. Parasitology (Science Press, Lancaster, Pa.), 24(5), Oct. 1938, pp. 472-473.

Comparative notes to support the synonymy.

Diseases and Parasites: Liver fluke of deer

Whitlock, S. C., and Carl Gower. Deer liver fluke common in the Upper Peninsula, Michigan Conservation (Dept. of Conservation, Lansing, Mich.), 8(2), Oct. 1938, p. 8, 2 photos.

Description and illustration of the fluke and of lesions caused by it. Alternate hosts are snails; the immature flukes encyst on water plants which may be eaten by deer; the young flukes thus swallowed then may mature and lay eggs to perpetuate the species.

Diseases and Parasites: Malaria

Herman, C. M. Epidemiology of malaria in eastern red-wings (Agelaius p. phoeniceus), Amer. Jour. Hyg. (Prince and Lemon Sts., Lancaster, Pa.), 28(2), Sept. 1938, pp. 232-243.

In the course of a study made of malaria in the eastern redwing at the Austin Ornithological Research Station on Cape Cod, Mass., during the summer of 1937, but 1 of 53 adult birds examined by blood smears was found infected. "When blood from 48 of these adults was subinoculated into clean canaries, 19 cases of Plasmodium circumflexum (40 percent) and 10 cases of P. cathemerium

(20 percent) were disclosed, a total prevalence of 60 percent. Parasites were observed in blood smears from only 2 of 86 young examined. Blood from 38 of these young was subinoculated into clean canaries, of which 11 subsequently showed parasites, an incidence of about 28 percent. All Plasmodium infections observed in young redwings were P. circumflexum x x x The evidence presented suggests that the young redwings did not obtain their infections while on the nest. A few obtained infections shortly after leaving the nest, but the greatest incidence was in birds about 1 mo. old. x x x The lack of infection with P. cathemerium in the young may be due to the fact that P. cathemerium produces a low grade of infection in redwings as compared with P. circumflexum." (Courtesy Experiment Station Record)

Diseases and Parasites: Mesocercaria

Olivier, Louis, and Theron O. Odlaug. Mesocercaria intermedia n. sp. (Trematoda: Strigeata) with a note on its further development, Journ. Parasitology (Science Press, Lancaster, Pa.), 24(4), Aug. 1938, pp. 369-374, 1 fig.

History of the genus, description and figure of the new species from frogs and snakes (Michigan). Notes on life history; detailed description of excretory system and comparison with those of other mesocercariae. Bibliography of 7 titles.

Diseases and Parasites: Minnesota investigations

Green, R. G., et al. Minnesota Wildlife Disease Investigation (Dept. of Bacteriology, University of Minnesota, Minneapolis), July 1938, pp. 52-59, graphs 1-2, tables 22-24; Aug. 1938, pp. 60-67, tables 25-29; Sept. 1938, pp. 68-73, tables 30-33; Oct. 1938, pp. 74-79, tables 34-37, 2 figs.; mimeographed.

July. Discussion of weights of snowshoe hares in health and disease; those dying from shock disease averaged 16 percent less in weight than "normal" animals. Sex ratio in the hares is discussed; the evidence indicates that shock disease does not affect one sex more than the other. Pathological reports on miscellaneous specimens relate to blue geese, robin, mallard, and muskrat; there are also necropsy findings for 5 snowshoo hares.

August. Data collected on cottontail rabbits during the snowshoe hare investigation indicate that this species undergoes cyclic fluctuations roughly synchronous with those of the hare. Another outbreak of botulism among waterfowl occurred in 1938; pathological reports are given on 9 specimens representing 5 species, all of which were found to have died from the disease. According to autopsies that are briefed, 7 quail from a State game farm died from ulcerative enteritis. Miscellaneous pathology notes are given for a caribou, 4 snowshoe hares, and a gray squirrel.

September. There is a note on the nature of viruses corroborating a suggestion made by Dr. Green in Science in 1935. A method of "Rapid diagnosis of canine distemper" by R. G. Green and C. A. Evans is reported; examination of smears of epithelial cells from the bladder enables diagnosis within an hour.

A second article on botulism presents the results of autopsies of 8 positive cases, representing 6 species, and emphasizes the dependence of the bacillus upon decomposed organic (especially plant) matter. Pathological reports relate to 4 snowshoe hares, a flicker, and a ruffed grouse.

October. Contains a special article on grouse populations abstracted elsewhere (Ecology: Census methods, p. 26) and the usual pathological reports, relating this time to 5 snowshoe hares, and one each of pintail, blue-winged teal, pheasant, and blue jay.

Diseases and Parasites: Papillomatosis in deer

Chaddock, T. T. Epithelial papillomas reported in deer, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(2), Feb. 1939, pp. 31-32, 1 photo.

Description and illustration of extensive benign tumors. The animal, which was shot, "was in very good condition."

Diseases and Parasites: Passer domesticus carrying poultry parasites

Hoyle, Wm. L. Transmission of poultry parasites by birds with special reference to the "English" or house sparrow and chickens, Kansas Acad. Sci. (Topeka) Trans. 41, 1938, pp. 379-384.

Review of published reports of the occurrence of ectoparasites of poultry on Passer domesticus. Statement of the author's findings from examination of these birds and their nests; both classes of material yielded chicken parasites. In experiments, the lice were transmitted from chicken to sparrow through dust baths, lived as long as 9 days on the sparrow and reproduced there. "The evidence at hand indicates that the common 'English' or house sparrow is a source for transmission of poultry parasites such as mites, lice, and sticktight fleas from an infested flock of chickens to one noninfested."

Diseases and Parasites: Perosis

Bass, C. C. Occurrence of slip tendon in quail in close confinement, Game Breeder & Sportsman (205 E. 42nd St., New York, N. Y., 20 cents a copy), 42(8), August 1938, p. 128.

The occurrence of perosis in both the bobwhite quail and Oregon mountain quail held in close confinement is noted. The addition of a small amount of manganese or 15 percent of rice polish, or both, to a perosis-producing basal ration prevented the occurrence of this disorder. (Courtesy Experiment Station Record)

Diseases and Parasites: Persimmon wilt

Beattie, R. Kent, and Bowen S. Crandall. Disease attacks the persimmon, American Forests (919 Seventeenth St., N. W., Washington, D. C., 35 cents a copy), 45(3), pp. 120-121, 124, 5 photos.

Wilt disease, first reported from Tennessee, is now known also from 5 other southern states. The most striking symptoms are wilting and yellowing of the leaves and the formation of fine brownish-black streaks in 5-6 outer annual rings of the trunk. The causal organism is an unidentified species of Cephalosporium; its spores are readily carried by the wind. The susceptibility of different species of persimmon is discussed. Persimmon is useful in erosion control due to its ability to pioneer on certain worn-out soils. Its fruit furnishes a considerable food supply for wildlife. Pages 122-123, enclosed by this article, contain an illustrated general account of the persimmon by G. H. Collingwood, who also refers to the value of the fruit to wildlife.

Diseases and Parasites: Rabies

Guilford, H. M. Rabies prevalent, Wisconsin Conservation Bul. (Dept. of Conservation, Madison, Wis.), 3(11), Nov. 1938, pp. 30-31.

A number of foxes and skunks from the southwestern part of Wisconsin have been found infected with rabies. Popular account of the disease and suggestions for avoidance and treatment.

Diseases and Parasites: Sarcocystis

Gower, Carl. A new host and locality record for Sarcocystis rileyi (Stiles 1893), Journ. Parasitology (Science Press, Lancaster, Pa.), 25(4), Aug. 1938, p. 378.

Black duck, Michigan. Notes on previous reports and results of autopsies.

Diseases and Parasites: Shock disease

Green, R. G., and C. L. Larson. A description of shock disease in the snowshoe hare, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa.), 28(2), Sept. 1938, pp. 190-212, 1 pl., 3 tables.

Reference to cycles particularly that of the hare with note on discovery of shock disease and reasons for the name. Description of the investigation and of the disease, its recognition, symptoms, and pathology. Authors' conclusions: "While our present knowledge of shock disease is inadequate, it seems sufficient, in relation to our systematic investigation, to permit the conclusion that this disease is truly the mechanism of the periodic decimation of hares. x x x We have definite evidence to show that shock disease is caused by local conditions and also evidence that the causal factors are associated with the immediate environment, probably the ground itself. At this time investigations on the causative factor indicate that an assumption that some toxic agent, associated with a parasite, might cause the disease is not unreasonable. A roundworm undergoing developmental stages in the lung tissue might be the source of a toxic agent which could produce such a derangement as we describe in shock disease. Other endoparasites, ectoparasites, and synthalin, which is derived from food plants must, however, be considered among the possible sources of shock disease.

"During the periodic decimation of the snowshoe hare population in the northern hemisphere, hares apparently in full health suddenly develop grave

symptoms and expire. Brought under conditions of captivity during the sharp period of decline, most hares succumb within a few days. We have come to refer to this condition as shock disease, as the symptoms and death are stimulated to appear by the stress of trapping or captivity, and the symptoms are generally due to hypoglycemic shock. The basis of the hypoglycemia has been discovered to be liver damage and resultant failure of glycogen storage. Shock disease has been found widespread in snowshoe hares in Minnesota during several years previous to and following 1936. The fact that deaths of hares from shock disease have been observed under natural conditions indicates that deaths in captivity are but an exaggeration of the occurrence and mortality of this disease in nature."

Diseases and Parasites: Sickle-cell anemia

Dougherty, R. W. Sickle cells in the blood of western deer, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 17-18.

Author's abstract: "Sickle-cell anemia in a black-tailed deer was first found in Oregon during the summer of 1938. Further investigation revealed that the condition was present in all the black-tailed deer available but not in mule deer or in a black-tailed X mule deer cross. Wright's stain, moist cover slip preparations, and supra-vital techniques were used in making the blood examinations."

Diseases and Parasites: Sickle-cell anemia

Whitlock, S. C. Studies on the blood of white-tailed deer, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 14-16.

Author's abstract: "The red blood cells of some white-tailed deer exhibit morphological changes that have been compared to the sickling phenomenon of human erythrocytes in sickle-cell anemia. The process was found to be similar but not identical. No pathological changes were found which could be correlated with the condition. Cell counts, hemoglobin determinations, serum analysis for calcium, phosphorus, and magnesium, tissue examination, weekly weight changes, and daily food consumption were used as means of investigation. Observations were made on twenty captive animals and sixty autopsies were performed in studying the situation. The change in cell morphology is looked upon more as a physiologic characteristic of deer erythrocytes rather than an evidence of disease."

Diseases and Parasites: Of starling

Cannon, D. G. On the parasites of the small intestine of the European starling (Sturnus vulgaris) in Quebec, Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada, 25 cents a copy), 53(3), March 1939, pp. 40-42.

Records from the literature of which 9 titles are cited. Notes on examination of Canadian specimens which yielded 2 kinds of cestodes and one nematode the latter described as a new variety, Capillaria columbae var. sturni.

Diseases and Parasites: Tapeworms in rabbits

Whitlock, S. C., and Carl Gower. Tapeworms in rabbits, Michigan Conservation (Dept. of Conservation, Lansing, Mich.), 8(2), Oct. 1938, p. 8.

"Blisters" in the body cavity of a rabbit contain larval stages of a tapeworm of dogs. Cottontails in the Lower Peninsula are 75% infected. They do not spoil the rabbits for human food but feeding carcasses or entrails raw to dogs is largely responsible for the great prevalence of the worm.

Diseases and Parasites: Ticks

Philip, Cornelius B. Ticks as vectors of animal diseases, Canadian Entomologist (Guelph, Ontario, Canada), 71(3), March 1939, pp. 55-65, tables.

Discussion of tick habits, distribution, and hosts and their role in disease transmission, with lists of the pathogens naturally or experimentally carried by ticks, and tick-borne diseases in all the continents. For North America there are 10, half of which are known to affect wildlife.

Diseases and Parasites: Trematodes

Paul, Allard A. Life history studies of North American fresh-water polystomes, Journ. Parasitology (Science Press, Lancaster, Pa.), 24(6), Dec. 1938, pp. 489-510, 3 pls., 1 table.

Review of literature of monogenetic trematodes with description and illustrations of a new subspecies from tree frogs (Hyla) and of a new species from a terrapin (Chrysemys) and notes on their life histories. Bibliography of 32 titles.

Diseases and Parasites: Trematodes of Anatidae

Cannon, D. G. Some trematode parasites of ducks and geese in eastern Canada, Canadian Journ. Research (National Research Council, Ottawa, Canada, 25 cents a copy), 16-Section C-9, Sept. 1938, pp. 268-279, 9 figs., 1 table.

Distributional notes, descriptive details, and illustrations of 8 species, two recorded from America for the first time, and one described as new. This is Stephanoprora mergi from the American merganser. Bibliography of 18 titles.

Diseases and Parasites: Trematodes of ducks

Gower, W. Carl. Studies on the trematode parasites of ducks of Michigan with special reference to the mallard, Agri. Expt. Sta., Michigan State College (East Lansing, Mich.), Memoir 3, 94 pp., 2 pls., 1 fig. June 1938.

Notes on the scope of the work and methods used. There are accounts of the genera and species identified in Michigan, each including history, names of hosts, and descriptive details. There is a key to 9 species of Maritrema and descriptions of novelties including Amphimerus elongatus n. sp., Maritrema nettae n. sp., and Leucochloridiomorpha macrocotyle n. g. and sp. A key is presented to the genera of trematodes known from ducks, as well as diagnoses of families and genera, and an annotated check list of the species. There is also a list of duck trematodes by hosts, a bibliography of 189 titles, and an index.

Diseases and Parasites: Trematodes, Reniferinae

Byrd, Elon E., and J. Fred Denton. New trematodes of the subfamily Reniferinae, with a discussion of the systematics of the genera and species assigned to the subfamily group, Journ. Parasitology (Science Press, Lancaster, Pa.), 24(5), Oct. 1938, pp. 379-401, 17 figs.

History, diagnosis, and key to 8 genera of these snake parasites, 2 new. Keys to species of all the genera, of which 7 are described as new. Discussion, phylogeny, illustrations, and bibliography of 11 titles.

Diseases and Parasites: Tularemia a bar to importation of rabbits

Whitlock, S. C. Danger of spreading tularemia one good reason against importation of rabbits for restocking purposes, Michigan Conservation (Dept. of Conservation, Lansing, Mich.), 8(6), Feb. 1939, pp. 5, 7.

In Michigan tularemia is known to affect, among other species, the ruffed grouse, cottontail rabbit, snowshoe hare, and man, the last-named being among the most susceptible. While tularemia is known to be a serious disease of cottontails in some localities, it is not known to have been epidemic in Michigan. Of 50 human cases reported from 1935-38, "a considerable percentage" were traceable to rabbits shipped into the State from the west. Although the risk of infection is slight, suggestions are given as to avoiding the handling of light, out-of-condition, or sickly rabbits. Symptoms of the disease in man are described and instructions given for victims. The danger of increasing the incidence of tularemia among Michigan rabbits is one of the strongest arguments against importation of cottontails. Alarming outbreaks of human tularemia in Illinois and Missouri in 1938 are referred to and the statement made that Michigan State Departments of Health, Agriculture, and Conservation "have taken a stand against importing rabbits for restocking purposes."

Diseases and Parasites: Of wild animals

Cameron, Thomas W. M. Animal parasites of wild animals, XIIIth International Veterinary Congress (Zurich-Interlaken, Switzerland), 8(1), 1938, pp. 13-22.

While a very high percentage of wild animals harbor parasites, resultant disease, which depends on massive infestation, is the exception rather than the rule. Localization and concentration of animals are important factors in building up parasite populations. This occurs rather rarely in nature but more frequently under conditions created by man. Effects noted in zoological gardens,

on fur and game farms, at fish hatcheries, and in wildlife reservations are discussed. A few parasites known to be of importance in the wild are named. Transfer of parasites from wild to domestic animals and to man is exemplified. The need for research and surveys is emphasized and technique adopted by the Institute of Parasitology in Canada described.

Ecology: Biologic balance, agriculture in relation to

Holt, Ernest G. What is a biologically balanced farm?, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 206-208, 2 figs.

Discussion of biologic balance, always a fluctuating one, that has been greatly disturbed by the activities of civilized man. Humans do not like to take the blame, so complain of rodent destruction of the range when livestock overgrazing is the real cause of the trouble. Isolated farms are more subject to damage by wildlife than those in blocks including little natural environment. On the other hand clean farming eliminates wildlife and deprives the farmer of its services in reducing insect pests. It also brings on erosion that may ruin the land. Some sort of return to biologic balance may be achieved by compensating for the necessarily destructive processes of farming by constructive and protective measures. These may combine erosion control and improved wildlife conservation with production of a reasonable volume of agricultural crops and upbuilding of soil fertility.

Ecology: Biologic balance, hedges in relation to

Enlow, C. R. Hedges conserve soil and wildlife, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 209, 223.

Hedges in France and Great Britain encourage a heavy population of small birds. These growths serve also as fences and help to control erosion; they should be planted on contours. "It has been stated that hedges harbor insects that attack crops. This may be true in some instances; but it must be admitted that they furnish protection for birds and predacious insects that feed on many insect pests. It seems to me that the planting of hedges within the limits of practicability and common sense would be a step toward restoring nature's balance on agricultural lands."

Ecology: Biotic districts of Oklahoma

Blair, W. F., and T. H. Hubbell. The biotic districts of Oklahoma, American Midland Naturalist (Notre Dame, Indiana, $1.00 a copy), 20(2), Sept. 1938, pp. 425-454, 1 map, 1 table.

Description of biotic districts and their plant associations together with lists of their orthoptera and mammals. Zonation is predominantly east-west indicating that precipitation, not temperature, is the most important controlling factor.

Ecology: Census of California sea lions

Bonnot, Paul, G. H. Clark, and S. Ross Hatton. California sea lion census for 1938, California Fish and Game (Ferry Bldg., San Francisco, Calif.), 24(4), Oct. 1938, pp. 415-419, fig. 140, 3 tables.

Report on 5 surveys made from 1927 to 1938, inclusive. Although commercial and sporting interests claim that a great increase in the animals has occurrred in recent years, the claim is not supported by the censuses. Present law gives the animals complete protection and no evidence of systematic violations was found. Tables present the details of counts by localities and for 2 species of sea lions. "The California sea lion population is not increasing. The depredations of the animals are nowhere as extensive as is claimed, and for the present there seems to be no reason to reduce their numbers."

Ecology: Census methods

Green, R. G., et al. Grouse populations, Minnesota Wildlife Disease Investigation (Dept. of Bacteriology, University of Minnesota, Minneapolis), Oct. 1938, pp. 74-76, 2 figs., 1 table, mimeographed.

Description of the strip-walking method and 2 patterns followed (these are figured) together with explanation and sample of the formula used in calculating populations. Tabulation and discussion of results for 7 years. Implausible variations in results led to careful consideration of the entire situation and to the conclusion "that, on areas which are not homogeneous in topography and cover, the strip-walking method of censusing has no advantage over mere observation by a trained field-man, and that a numerical designation assigned to the population on a basis of the strip-walking method implies an accuracy that cannot be justified."

Ecology: Census methods, elk

La Noue, Francis D. Census of the Yellowstone elk herd, University of Idaho (Moscow), Bul. 33(22), Dec. 1938, pp. 42-43.

"Factors conducive to accuracy in a count are: (1) Favorable weather; (2) a concentration on the winter range; (3) an ample number of experienced observers who know the country; (4) a sharply defined organization of the ground." Each observer is assigned a definite area; all are assembled before the count and the plan discussed as well as afterwards to bring out any possible duplicationsor misses that may have occurred.

Ecology: Census methods, fur animals

Hamerstrom, F. N., Jr., and James Blake. A fur study technique, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 54-59, 2 figs.

Authors' abstract: "The method, designed for ditch- and stream-dwelling furbearers on a 100,000 acre area in central Wisconsin, consisted of repeated surveys. Fur sign was mapped, by species, by the use of symbols (reproduced in

the paper). Notes on animals seen, mortality, foods, water levels, etc., were taken. Field maps were transferred to large-scale base maps for permanent record. The 200 miles of ditches and streams were covered by two crews of two men each in 17 days.

"Five surveys were made between May 1936 and August 1937. The survey data, summarized in the paper, showed where the animals were at different seasons, exactly where range improvement was necessary, where not needed, where impracticable, and what factors needed to be manipulated; where refuges should be placed. On an area too large to census and lacking kill records, abundance and distribution of sign can be used in empirical regulation of trapping. Suggestion: censuses of sample areas of heavy, medium, and light sign could be applied to the mileage of inhabited shore shown on maps to give a more accurate population figure than the general estimates so often used."

Ecology: Check-areas

Hanson, Herbert C. Check-areas as controls in land use, Scientific Monthly (Lancaster, Pa., 50 cents a copy), 48(2), Feb. 1939, pp. 130-146, 14 photos.

Suggests the extension to land use problems of the well known essential in scientific experimentation--controls. In this domain these would be suitable tracts of land and their employment is necessary if land utilization is to be based as fully as possible upon science. Relations of animals to soils are discussed and there is a section on "Control of rodents and carnivores" in which the suggestion is made that "attempted eradication should be delayed until accurate information is secured." The importance of check-areas is emphasized for all biological problems.

Ecology: Clearings

Lay, Daniel W. How valuable are woodland clearings to birdlife?, Wilson Bul. (Dr. J. Van Tyne, University Museums, Ann Arbor, Mich., 60 cents a copy), 50(4), Dec. 1938, pp. 254-256, 1 table.

Author's summary: "(1) Thirty-minute time unit bird counts are useful for expressing the relative abundance of birds in two or more types; (2) an average thirty-minute walk in the margin of a Walker County, Texas, pine woodland clearing may be expected to disclose 16 or 17 birds of 6 or 7 species. A similar walk in the interior of woodland more than 100 yards from the edge of a clearing discloses 8 or 9 birds of 4 or 5 species; (3) the margins of clearings have 95 per cent more birds representing 41 per cent more species than the interiors of corresponding woodland; (4) in the management of pine woodland the provision of well scattered, small (less-than-thirty-acre) clearings is distinctly favorable to birdlife."

Ecology: Cover preferences of pheasants

Leedy, Daniel L. Cover and its relation to pheasant production in Wood County, Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 86, 6 pp., 1 fig., 4 tables, mimeographed, April 1, 1938.

Observations made 1936-1938; "93% of the area is in farms; less than 1% in unpastured woodland, and only 6.1% in woodland (pastured and unpastured); the cover largely consists of cultivated crops and is subject to continuous alterations due to farming operations." A survey made in 1937 indicated a 31% mortality of hen pheasants from mowing in hayfields. Utilization of the different kinds of cover by seasons is described, tabulated, and graphed. Woods are used most in winter, least in summer, and more by cocks than by hens. Woods, weeds, and grass, and corn are frequented more than stubble, hay, soybeans, oats, and wheat.

Ecology: Deer, Idaho

Mass, Fred H. The deer situation in northern Idaho, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 30-34, 1 table.

Mule deer about 50 percent of the entire population inhabit high elevations of rugged topography, while the whitetails live on more gentle slopes in heavy cover. Winter range is at present adequate. Agents contributing to natural losses, in the order of their apparent importance, are: Predatory animals, parasites, old age, disease, and accidents. "Light" control of predators is practiced. There are notes on hunting and estimates of the deer population which seems to be steadily increasing.

Ecology: Drainage

Kenney, F. R., and W. L. McAtee. The problem: Drained areas and wildlife habitats, U. S. Dept. Agriculture Yearbook 1938, pp. 77-83, 2 figs. Separate No. 1611, Jan. 1939, 8 pp., 2 figs. (So long as the supply lasts, copies may be obtained free from the Biological Survey, Washington, D. C.)

Statistics and comment on drainage in relation to man by the first author and discussion of its wildlife relationships by the second. (An arbitrarily mixed, not a truly collaborated, article.) The value of areas efficiently producing some wildlife resource often is not realized until too late--after they are destroyed. Particularly is this true of drainage projects where probable injurious effects either to wildlife or man are rarely forecast or even thought of. The creation of farm fishponds and easement refuges in numbers, however, indicates a change both in sentiment and practice. Description of important restoration projects in the Federal migratory bird refuge program. There is comment also on upland wildlife restoration.

Ecology: Effects of drouth on Microtus

Wooster, L. D. The effects of drouth on rodent populations, Turtox News (General Biological Supply House, Inc., 761-763 East 69th Place, Chicago, Ill.), 17(1), Jan. 1939, pp. 26-27, 1 fig., 1 table.

During a drouth period (1933-37) meadow mice practically disappeared from the vicinity of Hays, Kansas. Measured in frequency of occurrence in barn owl pellets (numbers not stated) examined at the beginning and during the drouth, meadow mice dropped from 15 to 1. Pocket mice and harvest mice were chiefly seized upon by the owls to make up the deficit. The tabulation shows food items and their number of occurrences in pellets collected in 1933 and 1935.

Ecology: Elk-deer competition

Case, George. The influence of elk on deer populations, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 25-27.

"Originally, when the number of elk was small, the deer occupied the areas of lesser snow depths on favorable exposures, and the elk stayed in sizeable bands higher up the same exposure where the snow was from 1 to 2 feet deeper. As the elk increased in numbers, they pushed back to maximum snow depths and also encroached on normal deer winter range. Here the elk, being the larger and stronger animals, were able to reach higher and paw deeper snow to obtain adequate food. When the numbers of the two animals reached the point where feed became scarce, then the deer were the first to feel the pinch of undernourishment." Evidence is presented of the perishing of deer under these conditions, which also increase their vulnerability to predation.

Ecology: Fur animals

Kelker, George H. The relationship of fur-bearers to other wildlife, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 80-82.

Ecological relationships, particularly in food-chains.

Ecology: Mammals, Oklahoma

Blair, W. Frank. Ecological relationships of the mammals of the Bird Creek region, northeastern Oklahoma, American Midland Naturalist (Notre Dame, Indiana, $1.00 a copy), 20(3), Nov. 1938, pp. 473-526, 12 figs., 3 tables.

Description of the region and its ecological associations; annotated list of mammals; effects of drought; and population studies. "There is a tendency for the species that extend beyond the limits of their respective association types to be modified [generally to a sufficient extent to] form the basis for the recognition of subspecies." Bibliography of 22 titles.

Ecology: Mosquito control operations

Bradley, G. H. A consideration of some phases of the mosquito control problem, Journ. Economic Entomology (E. N. Cory, College Park, Md., 75 cents a copy), 32(1), Feb. 1939, pp. 110-112.

The phases discussed are those related to wildlife conservation and restoration. Stressing that salt-marshes vary greatly in character, the author says: "In discussing mosquito control, persons antagonistic to the work usually stress conditions on those marshes where the effect of ditching on wildlife habitats is most severe, and imply that such conditions are universal, whereas if such persons have any knowledge of marsh conditions in general they must know that such implications are misleading. However, there is no question but that undesirable changes do occur on many marshes following ditching, and for this reason mosquito control should be justified on the basis of the actual relief from mosquitoes and not on the lack of injury to marsh conditions or their

incidental improvement in certain cases as a result of the work."

Where benefits do not clearly outweigh disadvantages, mosquito control should not be undertaken. Careful record should be made of conditions before, during, and after treatment so that the work may be discussed on a basis better than faulty memories. Mosquito control is a biological problem and should be under direction of men with training fitting them to understand the ecological problems involved. Cooperation of wildlife authorities should be sought in connection with both preliminary surveys and operating plans. "This does not mean that, when a community has decided for mosquito control, it should be necessary to have the project approved by sportsmen's associations before work is started." Mosquito control officials do not desire to interfere needlessly with wildlife, and in Maryland, Delaware, and New Jersey are recommending "that no permanent marsh pond be ditched unless a considerable mosquito breeding area is affected by it," and then only by a spur ditch, that can be closed later if conditions warrant. Remedial measures are being applied also to ponds previously drained. The marshes so treated are improved for muskrat production.

"Mosquito-control men in New York, Rhode Island, Connecticut and various other states are now endeavoring to carry on their work in a manner that will affect wildlife on the marshes to the least extent possible. x x x It is believed by many conservationists familiar with marsh conditions that these marsh areas can be maintained without the sacrifice of essential and justifiable mosquito control correctly conducted. x x x The rapidly growing interest in conservation and rehabilitation of wildlife feeding and breeding areas, however, demands that attention be given by mosquito control officials to this problem. On the other hand, there is a danger of producing serious mosquito problems by water impoundments for wildlife habitats and for erosion and flood control, and persons in charge of such projects should likewise give careful attention to the mosquito hazard involved in their work."

Ecology: Mosquito control operations

Glasgow, Robert D. Mosquitoes and wild life as interrelated problems in human ecology, New York State Mus. Bul. (Albany, N. Y.), 316, Sept. 1938, pp. 7-20.

Discussion of the problem especially as involved in the enormous emergency employment campaigns. Wildlife is referred to in paragraphs on draining and filling, oil and larvicide, biological control, salt marsh ditching, upland control an urban problem, and in a section on wildlife conservation. "Mosquito control and wild life conservation have largely been developed, each without reference to the other, as if they were wholly unrelated interests," but "constitute a group of problems that can be solved only by careful scientific study; not by partisan dispute."

Ecology: Mosquito control operations

Taylor, Norman. A preliminary report on the salt marsh vegetation of Long Island, New York, New York State Mus. Bul. (Albany, N. Y.) 316, Sept. 1938, pp. 21-84, 18 figs., 1 map.

Complete form of paper noticed in WILDLIFE REVIEW No. 15, July 1938, p. 12. The bulk of the account is descriptive of the marshes and their ecology with special reference to depth of the water table below the surface and to salinity under the marsh. In discussing mosquito control, the author makes a distinction between the drainage of fresh water environments (which he deplores) and the ditching of salt marshes. The ditching is described and its physical and chemical effects appraised. The author's conclusions are:

"1. Ditching has made no fundamental change in the makeup of the salt marsh vegetation because ditching has not changed materially an environment predicated upon a very constant factor--the character and level of the salt water under the marsh.

"2. The undoubted changes that have come along the edges of the ditches appear to be due to conditions of aeration, freedom from competition and the changes in the hydrogen-ion concentration of the peat stacked up along the ditches. Such changes affect only plants of secondary successional significance, and the effects of such changes are about as important as the edging along a perennial garden border, the contents of which may be permanent, while the edging, like that along the ditches, may be changed from season to season. The only exception to this is marsh elder (Iva oraria), which, once it has captured a line of ditch, appears to stay. But there are miles of ditch where marsh elder x x x has not come in, even after nearly 20 years of ditching.

"There is one final caution to be observed in using these data. They apply only to the area studied. Whether ditching areas with a greater tidal range, or of different soils, or with different plants in them would provide similar results is purely speculative. There seems to be some evidence that tides of greater magnitude provide such a different set of conditions from those found on the south shore of Long Island, that ditching in such marshes might well result in very different conclusions than those presented here."

Ecology: Plant indicators

Sampson, Arthur W. Plant indicators--concept and status, Botanical Review (Fordham P. O., New York, N. Y.), 5(3), March 1939, pp. 155-206.

Wildlife managers must appraise vegetation, or in other words, make use of plant indicators; they should be interested in this resume of the subject. The main headings are: The indicator concept; plant guide to land use problems; range indicators; forest and soil indicators; plant indicators and chronology; and conclusions. Excerpts from the latter are: "The consensus x x x is that communities of plants are more reliable indicators than are individual species. x x x At present the grazing indicators are the best understood and the most extensively and successfully used. x x x In the future a broader use of indicator communities and species is likely, but such use is sure to be backed by sounder evidences than it has at this time. Preceding this possible broadened use there must first be more critical study of the growth requirements of both the indicator plant and the economic species; only then will the indicator concept reach its maximum reliance." There is a bibliography of 142 titles.

Ecology: Populations

Bureau of Animal Population (Oxford University, England), Annual Report 1937-38, 36 pp., 1939.

The report includes a general review of the year's work, statement of grants in aid, list of the staff and changes therein, accounts of research, game research, North American wildlife inquiries, and other investigations, list of publications by the staff, and notes on the library and its activities. The introductory discussion, doubtless by the Director (Charles Elton), includes a synopsis of factors to be taken into consideration in population studies, 8 items of which specify stages in life-histories at which censuses may be made, 5 list reproductive elements in population control, and 9, types of mortality. An organization chart is devoted to the structure of population research. The study of vole populations is reported on in some detail as to censuses, both of natural and marked populations, effects of voles on vegetation, development of a laboratory stock of this species, and epidemiology. A good deal of the work on game and other investigations has been reported upon in papers that have already been abstracted in WILDLIFE REVIEW.

Ecology: Populations, brant in California

Moffitt, James. Eighth annual black brant census in California, California Fish and Game (Ferry Bldg., San Francisco, Calif.), 24(4), Oct. 1938, pp. 341-346.

Report for the year and for a series of years beginning with 1931. The 1938 census yielded about an average figure. The results, discussed by areas, seem to be affected by many variables. An accompanying paper by Donald H. Fry, Jr., "Brant census of San Quentin Bay, Lower California" (pp. 347-349, figs. 112-113), gives results for an additional area in Mexico.

Ecology: Survival of nestlings

Hero, Casimir. Marsh bird community study, The Flicker (427 Eighth Ave., S. E., Minneapolis, Minn.), 10(3-4), Dec. 1938, pp. 1-3.

Ecology of a sandfill in Minnesota; general notes and tabulations showing the number of nests and eggs and their fates for red-winged blackbirds, sora and Virginia rails, and song sparrows.

Economics: Fur animals, Texas

Lay, Dan W. Fur resources of eastern Texas, Texas Game, Fish, and Oyster Commission (Austin, Tex.) Bul, 15, 7 pp., Feb. 1939.

Author's summary: "(1) The average income of trappers in a typical county (Walker) in eastern Texas for the fur trapping season 1936-37 was $57.58; (2) the $5,000 to $7,000 fur income of the county goes to the people who need it most. This cash income, received during December and January, keeps many families off relief rolls and has an appreciable effect on trade; (3) populations of raccoon and mink in eastern Texas are fairly high in favorable spots but these

species are becoming increasingly scarce. These high populations suggest that under proper management the fur resources can be maintained; (4) muskrats produced the bulk of the fur income of approximately $200,000 the winter of 1936 in three coastal counties, Jefferson, Chambers, and Orange."

Economics: Insects, mites, and ticks

Hyslop, J. A. Losses occasioned by insects, mites, and ticks in the United States, Bureau of Entomology and Plant Quarantine (U. S. Dept. Agriculture, Washington, D. C.), 57 pp., 13 tables, multilithed, 1938.

Wildlife students frequently have need of estimates of damage by insects. This is the most complete review of the subject that has been published and the figures reached are impressive. The material is presented according to groups of crop plants and their principal pests, and to miscellaneous pests including those of animals. Annual losses chargeable to mosquitoes, for instance, $145,525,000. The grand total for all pests, including control costs, is $1,601,537,000.

Economics: Rabbit, Jack

Saugstad, Stanley. The jack rabbit brings money to North Dakota, North Dakota Agr. Expt. Sta. Bul. (Fargo, N. Dak.) 1(4), March 1939, pp. 8-10.

Fur for use in the felt industry and carcasses for food of animals on fur farms are in considerable demand, bringing to the State annually not less than $100,000. Details of sales in 1936-37 and 1937-38 are tabulated.

Education: Conservation

Caldwell, John C. Taking conservation into the schools, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(10), Jan. 1939, pp. 14-15, 28-29, 3 photos.

Methods used by Tennessee Department of Conservation first in interesting and training teachers and then in extending the work to the schools.

Education: Conservation

Fenton, Carroll Lane. Conservation teaching--a panel discussion, Scientific Monthly (Lancaster, Pa., 50 cents a copy), 48(2), Feb. 1939, pp. 190-191.

Summary of papers on this subject given at the meetings of the American Association for the Advancement of Science and affiliated societies at Richmond, Va., in December 1938. Radio effectively teaches science in the grades. Science education must be planned for its social as well as its cultural values. Compulsory courses in conservation are likely to do more harm than good. They may be squeezed into already crowded schedules and taught by unprepared teachers "Such courses make a bad impression upon students, and that bad impression is

likely to continue into their adult lives. Equally bad is the system by which visiting speakers from sportsmen's organizations lecture to grade school children on conservation. Most of these speakers are hunters, not conservationists; they are interested in destroying rather than saving; they lack thorough understanding of the many phases of conservation and the extent to which these phases interlock." In Tennessee, travelling exhibits and demonstrations carry their message to schools and even to unorganized groups. Each visit is intended, however, to begin a conservation project. Once such a project is begun, there is no need for a law to force the teaching of conservation.

Education: Conservation

Thomas, W. Stephen. How a museum serves conservation, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(10), Jan. 1939, pp. 18-19, 28, 4 photos.

Program of the Academy of Natural Sciences of Philadelphia involving museum exhibits and conducted classes, radio talks, and nature walks.

Education: Extension

Palmer, C. M., Jr. Putting the facts to work, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 27(5), Sept.-Oct. 1938, pp. 84-85.

Outline of lectures and radio talks given by men of the Cooperative Wildlife Research Units in several states. A table summarizes other activities.

Education: 4-H bird clubs

Swenk, M. H. Nebraska 4-H bird club manual, Nebraska Agr. Expt. Sta. (Lincoln), Extension Circ. 5-01-2, 63 pp., 73 figs., 5 tables, Sept. 1938.

Objectives of 4-H bird clubs are stated, and suggestions are given by months of special topics for study and action. Brief accounts and illustrations pave the way toward acquaintance with some 40 species of birds. The tables present data on the food habits of hawks and owls, on migrations of 36 common Nebraska birds, and on bird houses and other devices for attracting birds.

Education: Pheasant management for 4-H clubs

Hill, Russell G. 4-H pheasant propagation and management project, Michigan State College (East Lansing, Mich.), Extension Division, Club Bul. 36, 35 pp., 18 figs., 3 tables, Oct. 1938.

This bulletin opens with a statement of the requirements for a project and suggestions of things to do and what to discuss in meetings for every month. Instructions are given for the care of chicks. Recognition of cover values and the maintenance of cover occupy one section of the publication and means of supplying food, another. In connection with these, one table lists trees, shrubs, and vines, their cover and food values, and soil preferences, while a second is devoted to food patch plants, their value, soil requirements, and

methods of cultivation. Feeding stations also are well discussed and illustrated. Other sections of the work relate to the use of flushing bars, to game census on the farm, fire as a destroyer of wildlife, predators, and harvesting. There is a list of 17 publications recommended to 4-H club members.

Education: For wildlife management

Hosley, N. W., Chairman. Report of the committee on game management with reference to forestry, Journ. Forestry (Mills Bldg., Washington, D. C., 50 cents a copy), 37(2), Feb. 1939, pp. 130-131.

At present one or more game management courses are taught in 23 colleges of which 19 offer graduate instruction. Review of their heterogeneous courses is not a practical method of defining what training for wildlife management should be, so the Committee records its views. In answer to the question, "Is wildlife management comparable to forest management in the sense that it is an art based on a body of classified knowledge, principles, and practices worthy of being set apart from pure vertebrate zoology as a separate entity?," the answer is a unanimous, Yes. The next question was: "Should an appreciation of wildlife management principles be a part of the training of a junior member of the Society" of American Foresters?. Again the answer was wholly affirmative. As to "What part in wildlife management can we expect the man to play who has only undergraduate training," the general feeling was that no very responsible tasks could be given such men and that one year of postgraduate work is likely to be more fruitful than any previous one. [Comment: Like other reports on the subject, this is inclined to forget that we are not yet an entirely collegiate crowd and to ignore the value of self-education and experience. The Committee forgets that our leading practicing wildlife manager and author of the book that first put the subject on a firm foundation in this country, had no college training whatever. Just to rivet this impression, let it be recalled that the Dean of the Graduate School of Johns Hopkins University, one of the foremost institutions of its kind, is no college graduate. The A.B. or its like may mean much or little but what the man can do means everything.]

The Committee protests against the filling of responsible wildlife management positions with untrained men. Forestry, zoology, or land use training are considered good bases for wildlife management education; the approach through applied, rather than research, biology is deemed best. A list is given of courses considered essential to a well-rounded curriculum for training in wildlife management.

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WILDLIFE REVIEW

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Food Habits: Bats

Sherman, H. B. Notes on the food of some Florida bats, Journ. Mammalogy (Wm. B. Davis, College Station, Texas, $1.00 a copy), 20(1), Feb. 1939, pp. 103-104, 1 table.

Notes on the stomach contents of 11 individuals of 4 species.

Food Habits: Birds, miscellaneous

Cottam, Clarence, and Phoebe Knappen. Food of some uncommon North American birds, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill., $1.00 a copy), 56(2), April 1939, pp. 138-169, 6 tables.

Information on 47 uncommon, rare, or extinct species based on 239 stomach analyses and on literature, 44 titles cited. The fullest accounts relate to the emperor goose, European wigeon, masked bob-white, passenger pigeon, large-billed sparrow, and Botteri's sparrow.

Food Habits: Bob-white and pheasant

Bennett, Logan J., and P. F. English. The fall foods of ringneck pheasants and bobwhites, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 10(1), April 1939, pp. 8-9, 29, 2 photos, 6 tables.

Report on analyses of crop contents of 61 bob-whites and 423 pheasants taken during the hunting season (October-November) in Pennsylvania. Methods are briefly discussed and the sources of the material tabulated by counties. The five most important foods of the pheasant are: Corn, akenes of lesser ragweed, grasshoppers, buckwheat, and seeds of skunk cabbage; and of the bob-white: Akenes of lesser ragweed, corn, wheat, seeds of foxtail grass, and buckwheat. Other items and their frequency of occurrence are listed. 74% of the food of the pheasant and 81% of that of the bob-white consisted of the seeds of crop plants and associated weeds. The best pheasant range in Pennsylvania is in counties where the corn acreage is highest and where the corn is hand-picked and the stalks are left standing over winter. Standing corn adjacent to good brushy cover seems to be necessary for the perpetuation of good bob-white populations. Results are compared with those reported from studies in other States, to 5 of which bibliographic references are given.

Food Habits: Bob-white

Errington, Paul L. Foods of bobwhite in Wisconsin, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill., $1.00 a copy), 56(2), April 1939, pp. 170-173.

Report on 58 stomach contents analyzed by the Biological Survey, arranged to show transition in choice of food through 5 divisions of the season, April-November.

Food Habits: Bob-white

Gray, Anderson M. Winter foods of the bobwhite quail in the Black Belt soil province of Alabama, Alabama Dept. of Conservation (Montgomery), 23 pp., 1 map, 2 tables, Dec. 1938.

The characteristics and plant associations of the Black Belt are described, and the location of the area shown on a map. The quail foods are discussed and tabulated in some detail.

Part of the author's summary is: Data on the winter food habits of the bobwhite quail were procured from the analysis of 440 stomachs collected from the Black Belt soil province of Alabama. The stomachs were obtained between November 20 and February 20 during several years. Vegetable items were found to form 96.89 percent of the food for the season and animal matter the remaining 3.11 percent. Legumes of the pea and senna families (Fabaceae and Cassiaceae) formed the bulk of the vegetable food, 63.34 percent of the total. It was found that 15 kinds of plants contributed one percent or more by volume to the bobwhite diet for the winter season. These plants, in the order of their importance are as follows: Japan clover, beggarweeds, partridge peas, pink wild bean, bush clovers, cowpeas, sesbanias, bull paspalum, oaks, sweet-gum, pines, ragweed, milk peas, pecan, and wild roses.

Food Habits: Deer damage to conifer plantings

Middour, J. C., and James N. Morton. Deer damage study plots in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(9), Dec. 1938, pp. 8-9, 30-31, 4 photos.

Reports on plots established in 1929; they were adjoining areas, one with a deer-proof fence, the other unfenced, on State forests in 4 counties, and planted to various conifers. Details are given as to destruction on the unfenced areas and as to comparative height growth and survival on the paired plots. In summary the authors say: "Only the results of the examinations of the experimental plots, made during 1938, have been listed, but these as well as reports made of investigations during previous years, indicate rather clearly that it is almost useless to attempt to establish forest tree plantations in the areas where the plots have been located, provided the deer herd remains as large as it has been since those plots were established in 1929. In many of these areas forest tree planting has been discontinued because it is considered impracticable due to the excessive damage by deer. Not only have most of the planted evergreens been destroyed on the unfenced areas, but the natural growth, likewise has been browsed so heavily that there is very little chance of a satisfactory stand of trees becoming established on these areas unless a reduction is made in the number of deer."

Food Habits: Deer damage to pine

Aldous, Shaler E. Pine in the diet of the white-tailed deer, Journ. Forestry (Mills Bldg., Washington, D. C., 50 cents a copy), 37(3), March 1939, pp. 265-267, 3 photos.

On the Superior National Forest, Minnesota, pine browse formed 7 percent of the food in fall and 14 percent in winter. All of the species of pine present are eaten, jack pine seeming to be preferred. Plantations of that species have been seriously damaged by the deer.

Food Habits: Deer and elk

De Nio, R. M. Stomach analyses of deer and elk in northern Idaho and Montana, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 34-36, 1 table.

Paper based on the same material as other articles by the author abstracted in WILDLIFE REVIEW, Nos. 15, July 1938, p. 29, and 17, December 1938, pp. 13-14. The present paper tabulates 6 principal classes of foods by frequency and volume of occurrence in deer and elk stomachs and lists the 10 most important species of forage for each of these groups of animals.

Food Habits: Foxes

Plattes, Cyril. Hello, Mr. Reynard!, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 65, Jan. 1939, pp. 11, 32, 34, 2 photos.

The distribution of both red and gray foxes has altered in Minnesota in recent years. Apparently establishment of the ring-necked pheasant has facilitated spread of the gray fox. General notes on habits and appearance of the animals, and on the State's experience with bounties. Tabulation by both frequencies of occurrence and volume of the food items from stomachs of 56 gray, and 29 red, foxes. Mice and rabbits make up nearly half of the subsistence of both species, with poultry and game birds together amounting to about 10 to 12 percent.

Food Habits: Grit requirements

McCann, Lester J. Studies of the grit requirements of certain upland game birds, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 31-41, 3 figs.

Author's abstract: "Experiments with bobwhite quail, Colinus v. virginianus, and ring-necked pheasants, Phasianus colchicus torquatus, on floored pens showed that a continued gritless ration resulted in loss of weight and death, probably due to mineral deficiency associated with lack of fresh grit. When feeding insoluble grit (quartz) it was found that grit consumption increased markedly, but would decrease almost immediately if calcium were added. Glacial gravel fed as grit did not undergo such increased consumption, and if substituted for quartz after an increase had occurred, would give the same effect as calcium. Thus, since grains are known to be calcium-deficient, it appears that granivorous birds depend upon grit for some of this necessary element. Glacial gravel, in some areas at least, is capable of supplying it. These facts gain ecological significance when correlated with the known success of certain exotic, granivorous birds in some glaciated areas or areas having limestone outcroppings, and

their known failure in certain unglaciated areas." Bibliography of 10 titles.

[Lack of calcium cannot be the reason pheasants have not succeeded in regions just south of the zone of satisfactory establishment as the limestone-dominated landscapes of southern Indiana, and of Kentucky and Missouri lie there.]

Food Habits: Grouse, Ruffed

Nelson, A. L., Talbott E. Clarke, and W. W. Bailey. Early winter food of ruffed grouse on the George Washington National Forest, U. S. Dept. of Agriculture Circ. 504 (Supt. of Documents, Washington, D. C., 5 cents a copy), 37 pp., 30 figs., 2 tables, Dec. 1938.

Well illustrated discussion of groups of plants that were the most important sources of foods found in 184 crops and 185 gizzards collected in 1935 and 1936. One table gives the results of stomach analysis on both volumetric and numerical bases and names the parts of the plants eaten; the other indicates shade tolerance of the plants. Twenty species made up about 85 percent of the total food; they grow chiefly in wooded areas with open canopies and with soils sufficiently productive for growth of mixed stands of shrubs and vines. Two-thirds of the illustrations are presented to facilitate field identification of the plants in winter condition.

Food Habits: Hare, Snowshoe, in relation to forests

Cox, W. T. Snowshoe hare useful in thinning forest stands, Journ. Forestry (Mills Bldg., Washington, D. C., 50 cents a copy), 36(11), Nov. 1938, pp. 1107-1109.

Interest in the hare has been aroused by its periodic fluctuations and by the damage it does to forest plantings, but the value of its services in thinning natural reproduction has been largely overlooked. The results of a study of thinning of jack pines by hares in Minnesota, which are tabulated, show reduction to an average survival of 5.8 percent. Unthinned, the seedlings make very little growth; thinned, the survivors recover from their stunted condition and make rapid growth. The author suggests that damage by hares in plantations can be controlled by making light rather than heavy plantings, thus avoiding the creation of dense cover attractive to the animals.

Food Habits: Hawks and owls

Bond, Richard M. Observations on raptorial birds in the lava beds--Tule Lake region of northern California, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif., 50 cents a copy), 41(2), March-April 1939, pp. 54-61, 1 fig., 3 tables.

The population of hawks in a given locality reduced 75 percent from 1936 to 1937 due in part to lessened abundance of rodents and possibly also to botulism. A tabulation records prey identified at the nests or by observation for 8 species of hawks. Lists are given of the food items determined from nearly 1,800 pellets of owls, representing, unfortunately, 2 species (mixed). As to bird prey the author says, "it is quite clear that none of the species is endangered, or

probably appreciably reduced in numbers, by either the hawks or owls." Calculation of the number of meadow mice needed to feed the predatory bird population gives an average of 12 per acre. The figures may be 50 percent in error and no definite conclusions are drawn.

Food Habits: Kingfisher

White, H. C. The feeding of kingfishers: Food of nestlings and effect of water height, Journ. Fish. Res. Bd. Canada (Toronto, Canada), 4(1), 1938, pp. 48-52, 2 figs., 1 table.

Author's abstract: "Nestlings on the Margaree river, Nova Scotia, are fed young salmon and trout only, whose average size increases with that of the bird, indicating selection by the parents. The proportions of trout (Salvelinus fontinalis) to young salmon (Salmo salar) in the food of the adults varies directly with the height of the water."

Food Habits: Legumes, utilization of by wildlife

Graham, Edward H. Legumes for erosion control and wildlife, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 210-211, 2 tables.

There are about 2,000 species of legumes native to the United States and 50 in cultivation that are of commercial importance. Plants of this group are a valuable source of food for wildlife. Available information from the literature and from Biological Survey files is tabulated to show the number of birds and mammals known to feed on various genera and species of legumes, and the kinds of wildlife that use legumes most. Clovers head the generic list and alfalfa the specific; the bob-white is far in the lead of consumers, being known to feed upon 88 species. The data are also discussed in the text and the extensive use and importance of legumes in erosion control pointed out.

Food Habits: Lizards

Knowlton, George F. Lizards in insect control, Ohio Journ. Science (Dr. Bernard S. Meyer, Ohio State University, Columbus, 50 cents a copy), 38(5), Sept. 1938, pp. 235-238.

Records of food identified from the stomachs of 9 kinds of lizards in Utah. There is often a perceptible limitation of agricultural pests in areas where lizards are abundant. Populations of from 50-400 Uta s. stansburiana per acre are not unusual in favorable breeding and feeding locations. [In such localities the effects of lizard feeding would far exceed those of birds.]

Food Habits: Merganser, American

Salyer, J. Clark, II, and Karl F. Lagler. The merganser--trout fancier, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 28(1), Jan.-Feb. 1939, pp. 33-36, 1 photo, 1 drawing.

In most streams the American merganser feeds chiefly on the rough fish there preponderating but on typical trout streams it also feeds largely on the most available prey, which is trout. This paper reports on analyses of the stomach contents of 157 birds of this species from Michigan trout streams. The average number of trout per stomach was about 2.5; the daily consumption is estimated at 5; probably 1.5 lbs. of food are eaten daily; rather large sized prey seems to be sought. In streams where there are great populations of small sunfishes, the mergansers may be beneficial in reducing their numbers and thus to some degree overcoming stunting. Where control seems to be required, the form recommended is driving the mergansers to lower open waters in which the proportion of trout among all fishes is low. Repeated drives tend to keep the birds on such waters. The mergansers can do great damage at rearing ponds and should be excluded by wiring.

Food Habits: Merganser, Red-breasted

Munro, J. A., and W. A. Clemens. The food and feeding habits of the red-breasted merganser in British Columbia, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 46-53, 1 map.

Authors' abstract: "The red-breasted merganser is an abundant visitant to the coast regions of British Columbia from September to April inclusive. Thus the relation of the species to the fisheries is seasonal and centers chiefly about its feeding habits on the coast waters. The food of ninety-six specimens taken on the lower stretches of coastal streams consisted largely of salmon eggs and sculpins while that of fifteen specimens taken on the sea comprised chiefly herring with a smaller percentage of salmonoids, eulachons, sticklebacks, sculpins, blennies, rockfishes, and crustaceans." Bibliography of 9 titles.

Food Habits: Nutritional value of pinon nuts

Little, Elbert L., Jr. Food analyses of pinon nuts, Southwestern Forest and Range Expt. Sta. (Tucson, Ariz.) Note 48, 2 pp. (mimeographed), Dec. 1938.

Analyses of nut meats of Pinus edulis, P. monophylla, and P. sp. (imported), with references to their sources, and general notes on food value of pinon nuts and pignolias.

Food Habits: Owl, Barn

Wooster, L. D. The contents of owl pellets as indicators of habitat preferences of small mammals, Kansas Acad. Sci. Trans. (Topeka, Kans), 39, 1936, pp. 395-397, 2 tables.

A study of the foods used by 4 barn owl families, the nests of which were so located that hunting by the parents was mainly in different ecological associations. Though not the author's chief interest in the findings, the well-known influence of availability upon food utilization is emphasized anew. Mammals of 17 genera were identified, Microtus, Peromyscus, and Perognathus in largest numbers.

Food Habits: Owl, Great horned

Langenbach, John R., and Robert D. McDowell, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(10), Jan. 1939, pp. 6-9, 3 figs., 7 tables.

Tables show the cause of death of the specimens reported upon, in part distributed according to sexes, years, and months. Extreme and average weights and measurements are given for a large number of the owls. Methods used in the food study are briefly discussed and the results presented in both text and tables. Economic classification of prey assigns 66.2 percent as beneficial to man, 18.2 percent harmful, and 15.6 percent neutral. The policy of no protection is approved and that of bounty payment recommended for continuance to facilitate further study of the food.

Food Habits: Owl, Short-eared

Hendrickson, George O., and Charles Swan. Winter notes on the short-eared owl, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.50 a copy), 19(4), Oct. 1938, pp. 584-588, 2 figs., 2 tables.

Near Ames, Iowa, a wintering group of short-eared owls (18 the maximum observed) fed almost exclusively upon mice from January 14 to March 13, 1937. They consumed some 90 mice daily, or about 5,880 for the period. Snow protected Microtus and caused the owls to take more Peromyscus. The results are compared with those of other recent studies by Errington and Tomkins.

Food Habits: Partridge, European

Ford, John, Helen Chitty, and A. D. Middleton. The food of partridge chicks (Perdix perdix) in Great Britain, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, London, N. W. 1, England, 20 shillings a copy), 7(2), Nov. 1938, pp. 251-265, 2 figs., 10 tables.

Authors' summary: "The contents of sixty-nine partridge chick crops were analysed, mostly from grass, clover and lucerne habitats. During the first 2 weeks after hatching the food is predominantly animal, during the third week a change occurs and from 3 weeks onward, food is almost entirely vegetable. Feeding on insects is probably random, the most important forms eaten being larvae of clover weevils, larvae of Lepidoptera, the springtail, Sminthurus viridis, Aphididae and ants. In evaluating the various constituents of the crops as to their importance as food, it was found necessary to consider not only the number of each species eaten, but also the volume and frequency of occurrence."

The figures graphically portray the change in proportions of animal and plant food and in weight of the chicks with age, information that is presented also in numbers in the tables. All food items identified are listed together with their frequencies by age groups of the chicks in addition to total numbers of occurrences. The food items are tabulated by groups also for each crop analyzed, again by age classes of the chicks.

Food Habits: Raccoon

Giles, LeRoy W. Fall food habits of the raccoon in central Iowa, Journ. Mammalogy (Wm. B. Davis, College Station, Texas, $1.00 a copy), 20(1), Feb. 1939, pp. 68-70, 1 table.

Analysis of 67 scats; corn, crayfish, and wild fruits the leading items.

Food Habits: Snail (Polygyra)

Wolf, Fred T., and Frederick A. Wolf. The snail Polygyra thyroidus as a mycophagist, Bul. Torrey Botanical Club (New York Botanical Garden, Bronx Park, New York, N. Y., 75 cents a copy), 66(1), Jan. 1939, pp. 1-5, 1 pl.

Fungi are an important source of food for mollusks, especially of slugs, accounts of which are reviewed. Less has been published on snails but 2 papers are abstracted. The authors' observations on the species mentioned are detailed; most of them were made in a laboratory. Bibliography of 11 titles.

Food Habits: Squirrel, Red

Clarke, C. H. D. Some notes on hoarding and territorial behaviour of the red squirrel, Sciurus hudsonicus (Erxleben), Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada, 25 cents a copy), 53(3), March 1939, pp. 42-43.

Cones of Pinus resinosa are gathered and scattered, scarcely concealed, in needle litter in the individual's territory. A squirrel may pick as many as a thousand cones in a day, but gets them from different sources and does not strip a single tree. It is doubtful whether one cone in a hundred is ever recovered by the squirrel, but the seeds from the cached cones do not germinate since the moist green cones heat and kill the seeds.

Food Habits: Squirrel damage to spruce

Anon. Squirrels vs. black spruce, Forest Research Digest (Lake States Forest Expt. Sta., St. Paul, Minn.), Winter 1939, pp. 15-16, 1 photo.

Cutting off twigs from 1-5 feet below tip so that the crown is of smaller diameter there.

Food Habits: Utilization of fruits of woody plants

Deck, Raymond S. Planting for wildlife, Country Life and the Sportsman (251 Fourth Ave., New York, N. Y., 50 cents a copy), 74(6), Oct. 1938, pp. 52-53, 107-109, 7 photos.

Personal observations on utilization of fruits of native and introduced woody plants in New England. Also brief notes on seed producers.

Food Habits: Water birds

Simpson, Thomas W. The feeding habits of the coot, Florida gallinule, and least bittern on Reelfoot Lake, Reelfoot Lake Biol. Sta. Report (Tennessee Academy of Science, Nashville, Tenn.) III, Jan. 1939, pp. 110-115, 1 table.

Description of the habitat, report on field observations, and notes from the literature of which 17 titles are cited. The results of stomach analyses are tabulated and summarized in the following paragraphs:

"1. The food of the American Coot consists of approximately 45 per cent coontail 'moss', 35 per cent duckweeds, 18 per cent yellow water-lily seeds, and 2 per cent animal matter.

"2. The food of the Florida Gallinule consists of 35 per cent coontail, 40 per cent duckweeds (mostly Wolffia), 20 per cent seeds of cutgrass and yellow water-lily, and 5 per cent animal matter.

"3. The food of the Least Bittern consists totally of aquatic animals, including 75 per cent fish, 10 per cent small frogs, 10 per cent aquatic insects (dragon-flies, water bugs, and others), and 5 per cent or less of small mammals.

"4. Observation of the Reelfoot Lake marsh birds seems to indicate that in this group availability plays a more important role than preference in food selection."

Life Histories: Bear, Black

Schoonmaker, W. J. Notes on the black bear in New York State, Journ. Mammalogy (Wm. B. Davis, College Station, Texas, $1.00 a copy), 19(4), Nov. 1938, pp. 501-502.

Chiefly on hibernation, and on number and growth of young.

Life Histories: Beaver

Ruedemann, Rudolf, and W. J. Schoonmaker. Beaver-dams as geologic agents, Science (Lancaster, Pa., 15 cents a copy), 88(2292), Dec. 2, 1938, pp. 523-525.

Beaver dams up to 2,140 feet long and impounding 1,241 acre-feet of wate are on record. Forty-six dams have been observed on 5-3/4 miles of a stream in Colorado. Beaver meadows may be formed in as few as 15 years. From their investigations, the authors conclude "that beavers are able to aggrade all smaller valleys below the size of navigable rivers and having been active for many thousands of years have accomplished an enormous amount of aggrading work and are important physiographic agents. Their work is characterized by comple aggrading of valley floors, originally in small descending steps, which dis-appear in time and leave a gently graded, even valleyplain horizontal from ban to bank. The fine silt gathered in the beaver pools has produced the rich far land in the valleys of the wooded areas of the northern half of North America.

[There is food for thought here as to the fate of stream impoundments.]

Life Histories: Beaver

Trump, George E. The beaver. Pennsylvania's most interesting fur-bearer, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(12), March 1939, pp. 4-5, 5 figs.

A popular account of the beaver and its activities and beaver trapping, illustrated by 5 drawings, by Earl L. Poole, of more value than the article itself.

Life Histories: Bighorn and mountain goat

Godden, F. W., and L. T. Gutzman. Bighorn sheep and mountain goat, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 43-49, 1 table.

Estimates of the population and kill by hunters and predators on the Salmon National Forest from 1917-1937, inclusive. Discussion of habits and decimating factors leading in each instance to the conclusion that more information is badly needed. Known facts are compared with the findings of Mills in Yellowstone National Park. Specific recommendations for research are made.

Life Histories: Deer, White-tailed

Schoonmaker, W. J. Notes on the whitetail deer in New York State, Journ. Mammalogy (Wm. B. Davis, College Station, Texas, $1.00 a copy), 19(4), Nov. 1938, pp. 503-504.

Interesting local notes (Columbia County, N. Y.) on home range (normally no greater than one-half mile square); sex relations (monogamous); and kill (one or two deer to each square mile).

Life Histories: Eider, American, eggs

Lewis, Harrison F. Size of sets of eggs of the American eider, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 70-73, 2 tables.

Author's abstract: "Record of 1,131 sets of Somateria mollissima dresseri observed on north shore of Gulf of St. Lawrence in 1934-1938. One to ten eggs each, average 4.04. Annual averages range from 3.89 (1936) to 4.25 (1938). Sizes of sets in descending order of frequency are four, five, three, two, six, one, seven and eight, ten. Average number of eggs before mid-June, 3.97; after mid-June, 4.08."

Life Histories: Game birds of Idaho

Murray, T. B. Upland game birds in Idaho and their future, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 55-60, 8 maps.

Discusses the original distribution and abundance and the decline of 7 native species, and the varying success attained in establishing 3 introduced game birds. The Idaho ranges of all of these are mapped. The fate of the various species is linked with land utilization and research is needed to make the best of the situation.

Life Histories: Goose, Greater snow, migration

Dery, A. Migration automnale de la grande oie blanche, Provancher Soc. Nat. Hist. Canada (Quebec) Ann. Report 1938, pp. 120-133, 1 photo, 2 maps.

Autumn movements from Cap Tourmente, Quebec, to New Inlet, N. C., with quotations from J. Richardson and Charles K. Nichols as to the spring migration.

Life Histories: Gopher, Pocket

Gabrielson, Ira N. Thomomys the engineer, American Forests (919 Seventeenth St., N. W., Washington, D. C., 35 cents a copy), 44(10), Oct. 1938, pp. 453-454, 478-479, 3 illus.

Equipment of the pocket gopher for tunneling. Damage done to gardens, alfalfa fields, and orchards and to mountain meadows through accelerating erosion; possibilities of control. Notes on food habits and life history.

Life Histories: Ground squirrel, Thirteen-striped

Criddle, Stuart. The thirteen-striped ground squirrel in Manitoba, Canadian Field-Naturalist (682 Mariposa Ave., Rockcliffe Park, Ottawa, Canada, 25 cents a copy), 53(1), Jan. 1939, pp. 1-6, 2 tables.

Summary of observations of the writer since 1882. Distribution is discussed and description, measurements, and weights given. Under general habits are notes on sounds made, period of activity, drinking, climbing, swimming, fighting, and dusting. Parasites are briefly mentioned, and the sex ratio, breeding habits, young, burrows, nests, hibernation, food, economic status, and control also are treated.

Life Histories: Grouse, Blue

Murray, T. B. Blue grouse, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 63-65.

Notes on subspecies in Idaho, their distribution, habits, food, nesting, and seasonal movements. The species is the best and most sought native upland game bird and should be the object of good management. The chief methods by which the birds can be restored and maintained, "are: first, to protect the native vegetation, upon which they depend for both food and [cover] x x x second, to regulate hunting, particularly in accessible areas, so that breeding stock is not threatened; and third, to keep predation down to a point where it is not serious. These measures are vitally important on the critical spring and early summer feeding ranges."

Life Histories: Kite, Mississippi

Sutton, George M. The Mississippi kite in spring, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif., 50 cents a copy), 41(2), March-April 1939, pp. 41-53, figs. 17-24.

This bird, which many ornithologists have never seen, is common in western Oklahoma, but subject to decimating influences of which the commercial egg collector is most threatening. The paper describes kite habitat, and gives notes on migration, behavior and physical conditions of the birds in spring, nest-building, nest and nest site, oviposition and incubation, eggs, young, food, and parasites. The food in May and June according to 16 stomach analyses made in the Biological Survey is almost exclusively insects, largely Orthoptera and Coleoptera.

Life Histories: Mammals, breath holding

Irving, Laurence. Respiration in diving mammals, Physiological Reviews (19 Chase St., Baltimore, Md., $2.50 a copy), 19(1), Jan. 1939, pp. 112-134, 4 tables.

Publication not abstracted but merely called to attention. It is a physiological and anatomical review of a complex subject, accompanied by an extensive bibliography. It includes tables citing duration of dives in 17 species of mammals, endurance of forced submersion of 6 species, and oxygen capacity of the blood in 9 groups.

Life Histories: Marten

Brassard, J. A., and Richard Bernard. Observations on breeding and development of marten, Martes a. americana (Kerr), Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada, 25 cents a copy), 53(2), Feb. 1939, pp. 15-21, 1 pl., 4 figs., 3 tables.

Notes on animals in the Quebec Zoological Gardens indicating annual production of from 1-3 young and gestation period of 220-230 days. Growth in weight and dimensions of the young are tabulated and those in weight expressed in graphs for 4 individuals. There are remarks upon the development of various characters, including the fur and the teeth. Bibliography of 6 titles.

Life Histories: Muskrat

Errington, Paul L. Reactions of muskrat populations to drought, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.50 a copy), 20(2), April 1939, pp. 168-185.

Consideration of adaptations of the muskrat for existence, attachment of the animals for home range, territories and movements, intraspecific strife, predators, foods and feeding routines, digging and building, and drought mortality. Author's summary: "Recent drought seasons have provided exceptional opportunities for the study of muskrat populations living under emergency conditions. Although the animals may show considerable tolerance to habitat changes and may modify their living routines accordingly, their behavior remains basically rather stereotyped. A large proportion of the muskrats resident in drying out habitats tend to stay in familiar home ranges, and, while they may suffer heavy or even annihilative mortality, they are usually more fortunate than the animals that attempt to go elsewhere. As vicissitudes become intensified, there is a conspicuous increase of intraspecific strife, vulnerability to predation

(notably by mink), random and often lethal wandering, and, in winter, losses from hunger and cold." Bibliography of 10 titles.

Life Histories: Napaeozapus

Sheldon, Carolyn. Vermont jumping mice of the genus Napaeozapus, Journ. Mammalogy (Wm. B. Davis, College Station, Texas, $1.00 a copy), 19(4), Nov. 1938, pp. 444-453, 2 pls.

Notes on live-trapping and the results of the study as to habitat preferences, home range, abundance, general habits, parasites, food, nests, breeding, development of young, and hibernation.

Life Histories: Otter, Sea

Fisher, Edna M. Habits of the southern sea otter, Journ. Mammalogy (Wm. B. Davis, College Station, Texas, $1.00 a copy), 20(1), Feb. 1939, pp. 21-36, 27 figs.

Observations illustrated by line sketches of a group of 60-80 animals off the coast of Monterey County, California. The notes pertain to resting, feeding, mating, swimming, sleeping, guarding, and vocalizing.

Life Histories: Pheasant, Ring-necked

Green, Wm. E. The food and cover relationship in the winter survival of the ring-necked pheasant, Phasianus torquatus Gmelin, in northern Iowa, Iowa State College (Ames) Journ. Sci., 12(3), April 1938, pp., 285-314, 9 pls., 2 tables.

Report on a study during the most severe winter (1935-36) recorded for Iowa. A considerable variety of cover was used and the author suggests that at times even bare ground has refuge value. Herbaceous cover lost its value through being filled with drifted snow. Evergreens were not observed to be used. Escape cover did not seem to be needed as at no time were pheasants noticed to be disturbed by a predator. The birds seemed to have forewarning as they began to congregate in cover several hours before a snowfall. Foods in the order of their importance included field corn, sweet corn, oats, and pigeon grass and other weed seeds; the feeding habits are described. Winter losses are discussed and tabulated; in all they amounted to 48.2 percent of the early winter population. They are attributed to 7 causes of which the most important was direct killing by the severe winter weather. Survival was highest in flocks that roosted in dense cover adjacent to a satisfactory food supply.

Life Histories: Pheasant nesting, Ohio

Leedy, Daniel L. Pheasant nesting study, Wood County, Ohio--1937, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 82, 9 pp., 1 fig., 2 maps, 3 tables, mimeographed, Feb. 1938.

"During the 1937 mowing season 197 meadows (about 10 per township) were checked in Wood County. These totaled 2,566 acres and 914 pheasant nests were reported, or an average of one nest per 2.8 acres of hay mowed. For each 100

nests, 9.9 hen pheasants were killed and 20.8 hens were crippled. Thus the percentage of hens killed or crippled was 30.7%.

"On this basis the 41,820 acres of hay in Wood County (Soil Conservation Service figures for 1935), contained 15,512 nests and the mowing season resulted in the death of 1,536 hen pheasants and the crippling of 3,226 others. Probably most of the crippled pheasants are killed by predators or die because only three of the 1,610 hens trapped on refuges in 1936-37 were believed to have been crippled by mowing machines."

The relative density of nesting in various types of cover is described and graphed; and the distribution of nests with respect to distance from an edge is stated in 3 categories; the nests are very evenly distributed. Data are recorded on various phases of nesting, decrease in broods after hatching, and sex ratio of young birds. There is a summary of 16 paragraphs.

Life Histories: Quail, Valley

Glading, Ben. Studies on the nesting cycle of the California valley quail in 1937, California Fish and Game (Ferry Bldg., San Francisco, Calif.), 24(4), Oct. 1938, pp. 318-340, figs. 101-111, 2 tables.

Author's summary: "The nesting cycle of the valley quail in the foothills of the Sierra Nevada is considered to be an important phase of the game management problem of this species in California. In a study on the San Joaquin Experimental Range of the U. S. Forest Service in Madera County, California, during 1937, a total of 96 nests of valley quail was found. Courtship and nesting behavior are outlined. The maximum number of nests was found in the month of May. The average clutch size in 40 incubated nests was 10.97 eggs. The average brood size in 16 hatched nests was 10.18 young. A wide range was exhibited as to choice of nesting cover, with dry grass being used most commonly, both as cover and as lining for the nests. Methods of identifying the work of nest predators are given. Seventeen of the 96 nests were successful. Ground squirrels are inferred to have robbed 30 of the 96 nests. An increase of quail has followed reduction of ground squirrels by poison on a 300-acre area for two years." There is a bibliography of 9 titles.

Life Histories: Rat, Wood

Lay, Daniel W., and Rollin H. Baker. Notes on the home range and ecology of the Attwater wood rat, Journ. Mammalogy (Wm. B. Davis, College Station, Texas, $1.00 a copy), 19(4), Nov. 1938, pp. 418-423.

The home range is small, about 80 feet in diameter in the most definitely ascertained instance. Homing occurred from distances up to 1,360 feet in woodland, but failed when the animals were released in grassland. There are observations on population density, habitat relationships, dens, food, fighting, animal associates, and ectoparasites. The food included fruit and leaves of water oak, hackberry, and yaupon, and leaves of several other plants (named).

Life Histories: Sex ratio of birds

Mayr, Ernst. The sex ratio in wild birds, American Naturalist (Science Press, Lancaster, Pa., $1.00 a copy), 73(745), March-April 1939, pp. 156-179.

Summary and discussion of available information. Author's abstract: "(1) The principal purpose of this paper is to show that in birds a great deal of well-documented evidence exists proving the occurrence of strongly uneven sex ratios; (2) the sex ratio may be high or low, favoring the male or the female sex; (3) the evidence points to the existence of this unbalanced condition already in the primary sex ratio, although physiological and environmental factors may modify it during prenatal and postnatal life; (4) in nearly all well-studied cases unequal sex ratios have been found to be correlated with peculiarities in the life history of the birds; (5) the study of the cytology and genetics of sex determination in birds is a promising and practically untouched field."

Life Histories: Squirrels

Kelway, Phyllis. The grey squirrel, Game and Gun and the Angler's Monthly (34 Victoria St., London, S. W. 1, England, 1 shilling a copy), 16(162), March 1939, pp. 159-162, 4 photos.

Comparison (fairer than usual) with the native red squirrel. The gray species has a wider range of food and is more voracious; both species eat birds' eggs. There is no serious conflict between them. Miscellaneous notes on their life histories are included.

Life Histories: Thrush, Wood

Weaver, Florence G. Studies in the life history of the wood thrush, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass., 75 cents a copy), 10(1), Jan. 1939, pp. 16-23, 1 fig.

Two years study at Ithaca, N. Y., reported under the headings of Territory, Song, Courtship and mating, Nest, Social parasitism, Number of eggs laid and survival of the young (43.13 percent), and Second brood.

Life Histories: Woodchuck

Twichell, A. R. Notes on the southern woodchuck in Missouri, Journ. Mammalogy (Wm. B. Davis, College Station, Texas, $1.00 a copy), 20(1), Feb. 1939, pp. 71-74.

Dens, non-colonial habits, population density, cruising radius, food (in captivity), time of activity, watchfulness, hibernation, breeding season, and parasites in central Missouri.

Life Histories: Woodpecker, California

Ritter, Wm. E. The California woodpecker and I, University of California Press (Berkeley, Calif., $3.50 a copy), 340 pp., illus., 1938.

Titles of the life history chapters are: The species--its relatives, and its place on the earth; Foods--storing-- solution of the food problem; Reproduction and domesticity; problems of settlements and journeyings; and The defense of home and food sources. Most of the book is rambling philosophy which the author terms "A study in comparative zoology, in which are set forth numerous facts and reflections by one of us about both of us." There are 4 pages of bibliography and a comprehensive index.

Management

Cahalane, Victor H. Integration of wildlife management with forestry in the Central States, Journ. Forestry (Mills Bldg., Washington, D. C., 50 cents a copy), 37(2), Feb. 1939, pp. 162-167.

Favorable and unfavorable effects of wildlife on forests are discussed and the correlation of forest management and wildlife management treated under the heads of forest protection, grazing, and silviculture. Author's conclusion: "If wildlife resources are given adequate consideration, managers of public forest lands will not be forced to overemphasize wildlife practices as a result of pressure from recreationists, and private landowners will have an opportunity to cash in on cooperation with the sportsmen. With knowledge gained from research on the interrelationships and needs of plants and animals, wildlife management can be integrated with sound forest management in all regions of the country, and especially in the well-settled Central States." Bibliography of 16 titles. Brief discussion by 5 individuals is reproduced following the article.

Management: Attracting barn owls

A., R. Helping the useful barn owl, Game and Gun and the Angler's Monthly (34 Victoria St., London, S. W. 1, England, 1 shilling a copy), 16(162), March 1939, pp. 147-150, 4 photos.

By providing nesting accommodations in the form of boxes or barrels (preferably the latter) securely fastened in suitable trees. Bedding as sawdust or peat-moss should be supplied. Barn owls accept such quarters and return to them year after year. There are notes on competitors and their control. More than in the case of any other British owl, rats seem to constitute the principal item in the barn owl's diet. The value of the services that they render to keepers and farmers would indeed be hard to compute.

Management: Beaver

Smith, Laurence H. Beaver and its possibilities in water regulation, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 85-88.

Primitive abundance of beavers and their decimation by trapping. The value of dam construction by a colony of beavers may be a hundred dollars and the dams, furthermore, are kept in repair. Estimates of beaver values on the

Ochoco National Forest in water conservation and associated forage production are impressive enough to justify any reasonable program of transplanting and management. The most successful plantings were made among aspen-poplar growth, and following those, in aspen-willow, and lodgepole-willow-aspen. Beaver transplanting is an economical offset to practices destructive to watersheds. It should be based on studies of beaver requirements and of the available food resources, and calls for rigid protection of the new colonies.

Management: Big game

Hatch, A. B. Big game management, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 49-54.

Public interest in hoofed game, the applicability of knowledge of livestock to these animals, and the distressing phenomena of overpopulations point to the feasibility and need of big game management. The large ruminants have been forced out of their original plains and foothill range into unnatural environment at higher elevations, where, it is not surprising, difficulties arise. "The primary objective of big game management today is to maintain an optimum number of removable animals on all lands on which the raising of wildlife crops does not seriously interfere with agriculture, with the livestock industry, or with forestry." Methods of managing big game are discussed under four headings: (1) Artificial restocking, (2) predator control, (3), restriction of hunting, and (4) creation of game refuges. Changes in present practices must be gradual and should be guided by research.

Management: Bobwhite

Lehmann, Valgene W. Fenced areas for bobwhites, Texas Game, Fish, and Oyster Commission (Austin), Bul. 12, 2 pp., 1 pl., June 1938.

"Properly planted half-acre plots, fenced to exclude livestock and spaced about 250 yards apart, offer landowners one of the most effective and inexpensive means of improving habitat conditions for Bobwhite Quail. The plots provide protected 'islands' in which Quail can find plenty of food and x x x cover in which to build their nests and raise their young. There are many Quail ranges in Texas that produce few Quail because they are overgrazed by cattle, sheep and goats, or cultivated so intensely that little food or cover is left for birds. The half-acre fenced plots, square or rectangular in shape, are recommended to remedy this situation." Directions are given for laying out and planting fenced areas for two kinds of situations, namely where woody cover is already present, and where it is absent. Quail are quick to find and use these half-acre shelters.

Management: Burning

Heyward, Frank. The relation of fire to stand composition of longleaf pine forests, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.50 a copy), 20(2), April 1939, pp. 287-304, 7 figs., 6 tables.

This article is drawn to the attention of readers of WILDLIFE REVIEW who wish to keep informed as to debate in this controversial field. The author

refers to the relation of woodland management, particularly burning, to wildlife, basing his remarks in that respect upon Stoddard's publications. He shows that exclusion of fire results in the increase of hardwoods in a longleaf pine forest and states that "it seems evident that pines will ultimately be completely excluded from the forest by hardwoods." [Comment. It is thus further evident that burning, a game management practice in longleaf pine forests, is necessary to perpetuation of those forests, the most valuable known for their region.] The article includes a bibliography of 12 titles.

Management: Burning

Stoddard, Herbert L. The use of controlled fire in southeastern game management, Cooperative Quail Study Association (Thomasville, Ga.), 21 pp., Jan. 1939.

Supersedes a 1935 report on the same subject (abstracted in WILDLIFE REVIEW, No. 1, September 1935, p. 13) but has been entirely rewritten. Quail land in the Southeast, varying from 10 to 75 percent cultivated, may produce satisfactorily provided the uncultivated part is maintained in proper condition for the birds. That involves chiefly cover control for which fire is the most economical agent. It has long been used, and despite propaganda against woods burning, it is not generally destructive as claimed, has known positive values and, properly used, is definitely recommended. The author says, "Due to the accumulation of evidence we believe that burning at the right time, in the right amount, with the proper frequency, and in a way to accomplish the desired results with the least damage to other interests, is the most important single operation involved in quail management in the region. We differentiate sharply between controlled burning and uncontrolled burning. If a choice had to be made, however, between late winter burning of the kind long carried on by natives of the region (who know more about fire use than they are usually given credit for) and the total fire exclusion policy so strongly advocated by some, the former would be vastly preferable so far as wildlife interests are concerned."

Fire exclusion damages lands for quail production and builds up fire hazards in the form of dense ground cover and litter. "Then all too frequently, during a period of summer drought and high wind the inevitable happens--the woods catch fire accidentally (from lightning, a cigarette butt or other cause)--and the result (owing to the accumulation of highly combustible ground cover) is denuded land and a fire-damaged forest, destitute for a time of valuable wildlife and scenically an eye-sore. Fire-damaged areas, resulting from mistaken attempts at fire exclusion without adequate safeguards, are becoming all too numerous over the deep Southeast. Properly controlled burning at intervals of from one to three years is the best known insurance against destructive conflagrations in pine forests."

Controlled burning is discussed as to the proper season, frequency of use, proportion of land to burn, block and spot systems, night and day application, and tools for control.

A game production program in the Southeast fits in well with a type of forestry that has as its objective selective cutting of the largest trees or clean cutting of small acreages. The longleaf pine, of leading value, is

especially fire resistant and controlled burning may be effectively used in establishing and maintaining stands of this species. Other pines should be given complete protection from fire during the seedling and early sapling stages. Then too dense ground cover under them can be thinned by light late winter night burning. Upland hammock of mostly deciduous trees should not be burned.

There is special discussion of burning in relation to wild turkey production, of fire as a means of cotton rat control, of burning to maintain the floral beauty of pinelands, and in relation to ticks, chiggers, and disease.

Management: Correlation of pest control and soil conservation practices

Harris, Kenton L. Soil conservation versus insect control, Proc. Entomological Society of Washington (U. S. National Museum, Washington, D.C. 50 cents a copy), 41(1), Jan. 1939, pp. 20-26.

Quotations from authorities on the subjects noted in title. The recommendations, to some extent opposed, are discussed and tabulated. In general, insect pest control policies call for elimination of ground cover--the fundamental resource for soil conservation. For the two agencies concerned to meet on common ground will probably depend upon advances from the entomologist's side. Bibliography of 31 titles.

Management: Deer, White-tailed

Swift, Ernest. The problem of managing deer, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(2), Feb. 1939, pp. 8-27, 6 figs., 2 tables.

Mostly discussion of differences of opinion about the deer population and its management but includes some data and maps of general interest. The maps show distribution of the deer in winter and summer. A graph and a table record the number of deer tags issued and the estimated kill from 1917 to 1937. Increase in the bag, and in damage by deer as well as observation indicate growth and spread of the herd. Deer drives are discussed; in a considerable number the deer seen were from 28 to 32 per section, averaging 30. The sex ratio varied with locality from 1:1.5 to 1:5. Overpopulation especially in winter yards has begun and winter feeding has been resorted to, although regarded as biologically unsound. Dressed weights cited are an average of 166 lbs. for 79 bucks, and 315 lbs for the heaviest specimen of the year.

Management: Deer in Michigan

Bartlett, I. H. White-tails--presenting Michigan's deer problem, Michigan Conservation (Dept. of Conservation, Lansing, Mich.), 8(2), Oct. 1938, pp. 4-5, 7, 1 photo; 8(3), Nov. 1938, pp. 4, 6, 8, 11; 8(4), Dec. 1938, pp. 6-7, 10, 3 photos; 8(5), Jan. 1939, pp. 8, 11; 8(6), Feb. 1939, pp. 6-7, 2 photos; 8(7), March 1939, pp. 8, 11. Also printed in pamphlet form with numerous illustrations (same source), 64 pp. (5-1/4 x 7-1/2 inches), 17 photos, 1 map, tables, Oct. 1938.

Statement (illustrated by map) of original ecological conditions as related to deer. In the southern part of the Lower Peninsula, agriculture at first favored, but later suppressed, deer. In a few areas, herds propagated from reintroduced animals do much damage on farms. In districts less suitable for agriculture, logging of heavy timber stands brought about food and cover conditions that resulted in an increase in deer; then repeated burning decreased the deer carrying capacity of cut-over lands; and in comparatively recent times effective fire control has swung the balance again in favor of the deer. At one time market hunting and use of deer for food at logging camps threatened extermination, and from 1881 on increasing restrictions on the killing of deer were enacted into law. The control thus achieved together with the environmental improvement mentioned have been followed by increase in the herds that has been very apparent since 1925. Now the tendency of food plants to grow out of reach of the deer and destruction of much browse by overconsumption, especially in winter yards, seem to indicate that the deer herds are likely to undergo another decline.

A test of management is presented, but fortunately much of the investigation basic to management has been accomplished. It includes survey and classification of deer yards (70-80 percent complete), studies of the sex ratio, counts by deer drives, calculation of the kill based on hunters' reports, experimental study of food consumption, studies of trapping and tagging, and diseases and parasites. Inventory shows that in the Upper Peninsula deer average 18 per square mile, that the total number is about 300,000, of which 1 in 5 are bucks. Hunters kill about a third of the bucks, a number considerably less than the annual increase of both sexes. Winter crowding is severe, food supplies are failing, and there is much fawn mortality. In what is considered deer country in the Lower Peninsula, the animals average 50 to the square mile, about 10 percent of which are bucks. Protection on club lands and on refuges has increased winter losses from starvation and winter feeding has not proved a feasible method of reducing them. The number of hunters has rapidly increased but in the last 7 years their success ratio has dropped from 37 to 24 percent; the annual kill varied from 8,000 in 1931 to 26,000 in 1937. The findings as to the two Peninsulas are summarized in a State table. Management requires control of both the habitat and the herd, and must be correlated with desirable forestry practices in every area. In winter yards, white cedar should be cut on a 25-year rotation to establish and maintain a good supply of browse. Summer food is now in great excess. The numbers of deer should be controlled by regulated hunting, differing from area to area as may be needed.

Management: Electric fence in

McAtee, W. L. The electric fence in wildlife management, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 1-13, 2 pls.

Electric fencing promises to solve outstanding difficulties of the wildlife manager, but the device needs perfecting and constantly cautious and intelligent use. Types of fences, means of electrifying them, and methods and difficulties of installation are described. Experiences reported to date in controlling animals are quoted with reference to antelope, bear, buffalo, cat, coyote, deer, elk, fishes, livestock, rabbits, and raccoon. The article con-

tains suggestions, objections, and cautions relative to the use of electric fences, and concise directions as to what to do in case of severe electrical shock. Bibliography of 15 titles.

Management: Elk

Parsell, Jack. The elk problem in the Selway, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 23-25.

From small numbers in 1900, elk have increased until parts of the range are overpopulated. The present kill by hunters does not offset the annual increase and it leaves some of the herds untouched. Management needs are: "First, to regulate the size of the game herds to the carrying capacity of the winter ranges; and second, to obtain in some manner a proper distribution of hunters to make balanced use of the game resource." A companion paper, "The us of controlled hunting in the Selway in 1937," by Jess Robertson and A. B. Hatch (pp. 29-30) reports on a special hunt intended to reduce the numbers of elk on remote overpopulated area; the results were "disappointing."

Management: Farm game

Dambach, Charles A., and Ernest E. Good. Profits for the farmer, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 227-228.

Wildlife on farms is desired by sportsmen and nature lovers but "The farmer's interest in maintaining this resource, which only he is in a position to control, depends, however, upon his conviction that wildlife management is a profitable practice on his land." Farmers may get returns from trapping and selling furs or from collecting and marketing food animals, as rabbits; example are given. Problems of the farmer in relation to hunter trespass are discussed and some of the methods (Williamston Township, Mich.; Wood and Butler counties, Ohio) of solving them are reviewed. "Control of hunting, however, is only part of wildlife management, though it is becoming increasingly necessary, especiall near large urban population centers. A direct cash return from the sale of fur and of hunting or fishing rights is important as an incentive to the farmer to make positive provision for the welfare of his wildlife. The greatest value of sound wildlife management on the farm, however, is biologic, for the natural flora and fauna profoundly affect every farmer in his economic and social relationships with the land."

Management: Farm game

Davis, Kenneth S. Game fits in--to a system of soil-saving, money-making farming; and affords a Minnesota neighborhood real enjoyment in the bargain, Successful Farming (1714-24 Locust St., Des Moines, Iowa, 5 cents a copy), 36(10), Oct. 1938, pp. 9, 40-43, 2 maps.

A popular account of soil conservation practices in relation to wildlife and good farming. A land-use pattern cutting across farm boundaries leaves are where game fits in. Notes on strip-cropping, woodland management, and food patches.

Management: Farmer-sportsman relationship

Baker, John H. No wonder the farmer's frantic, Bird-Lore (1006 Fifth Ave., New York, N. Y., 30 cents a copy), 41(2), March-April 1939, pp. 96, 97-98, 1 cartoon.

The serious problem that hunting trespass presents to farmers is illustrated by examples. An underlying aggravation of the difficulty is the policy of State game departments of selling ever more licenses. "If hunting and fishing as sports are to prevail, basic policies will have to be, not, as is too often the case today, opposition to the posting of land and seeking maximum current income from the sale of licenses, but earnest desire to protect the rights of farmers and other landowners, and solicitude to assure observance of the laws and regulations and considerate, sportsmanlike conduct." As a step toward restriction of the number of licenses, the author suggests examinations for applicants. It would help also if trespass regulations were incorporated into game laws and enforced by game wardens. "We believe that landowners deserve protection of their rights by the state, and that, by and large, they aren't getting that service. It seems to us that, given the leadership of the Conservation and Fish and Game Departments, the hunting and fishing fraternities have it well within their power to quit committing gradual suicide. Will they do it? We think so, when it sinks in that it is they, not the farmers, who need to change their tune. The handwriting is on the wall, as clear as clear can be. The 'Sell more licenses' policy spells the end of hunting and fishing as legal sports."

Management: Farmer-sportsman relationship

Burroughs, R. D. When farmers and hunters cooperate, Michigan Conservation (Dept. of Conservation, Lansing, Mich.), 8(1), Sept. 1938, pp. 4-5, 2 photos, 2 tables; 8(2), Oct. 1938, p. 11, 1 table.

There are about half a million pheasant hunters and 12 million acres of pheasant range--one hunter to every 27 acres of pheasant territory in 1936. The law providing penalties for hunting without permission is quoted and trespass troubles are discussed. The Williamston plan is described as well as its spread, which in 1936 included 33 projects in 13 counties. Cooperation of the State Conservation Department in extending the system; in 1937 there were 34 cooperative exchanges in 16 counties. Working of these projects is summarized. A higher proportion of sportsmen than of farmers were satisfied; the farmers still need assistance in curbing trespass. Difficulties are discussed and suggestions for improvements made. Plans have been revised and each farmer participant receives a printed set of instructions. The merits of the cooperative plan are summarized.

Management: Farmer-sportsman relationship

Conklin, W. Gard. The Pennsylvania cooperative farm-game program, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 10(1), April 1939, pp. 4-7, 30-31, 2 photos, 2 maps, 1 table.

A review of the plan and its progress in 3 years. Experience has revealed no insurmountable difficulties and it is expected that with cooperation of both farmers and sportsmen, it will thrive and spread. Projects may be established in 27 counties and in 1938 there were 58 in all, involving more than 73,000 acres. Pheasants and rabbits were generally present in satisfactory numbers but a scarcity of quail was reported on all project areas. A medium crop of game is disappointing to sportsmen while a large crop attracting excessive hunting would be objectionable to farmers. What the latter principally get out of the arrangement and what they most appreciate is protection against willful or careless destruction by hunters. Sixty-five deputies were employed and this was one of the most costly features of the program. This patrolling cannot be indefinitely extended by the State, and should be supplemented by volunteer action on the part of sportsmen. Not a single hunting accident was reported--a fine record compared to that of other areas. Farmers are encouraged to preserve cover, and paid for making food patches, leaving strips of grain unharvested, and for rearing pheasants to 6 weeks from chicks supplied by the Game Commission. The Commission also does considerable direct stocking. Estimates indicate that 41,534 hunter-days were spent on the 58 projects and that the following game was taken: Rabbits, 48,350; pheasants, 15,776; quail, 859; squirrels 7,857; grouse 152; and deer, 40. Expenditures of the Commission are analyzed and explained; they amount to about 32.8 cents per project acre per year.

Management: Farmer-sportsman relationship

Hill, R. G. The Williamston plan of controlled hunting, Michigan Farmer (1632 Lafayette Blvd., Detroit, Mich.), Oct. 22, 1938, pp. 3, 12, 4 photos.

Most of the small game is on farms but farmers are considerably annoyed by those who come to hunt it. The Michigan law provides punishment for trespass but farmers either dislike to employ the law or find it difficult to establish the identity of hunters. The Williamston Plan, devised to solve the problems of both gunners and farmers, worked well and has been applied to 750,000 acres in 17 counties. The plan is described but it must be familiar through frequent mention to readers of WILDLIFE REVIEW, so is not further noticed.

Management: Farmer-sportsman relationship

Wenzel, Herman C. Farmer-sportsman cooperation, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 63, Dec. 1938, pp. 6-7, 26, 10 photos.

"Farmers can produce more game than all the state's game farms combined if they can be convinced that such game is a tangible asset to them." The Commissioner of Conservation (whose photograph accompanies the article) believes that farmers should receive some revenue from wildlife production and cites some examples of payment for shooting privileges. Land unsuitable for crops can be used for wildlife propagation to the benefit of both sportsmen and farmers.

Management: Feed patches

Leopold, Aldo, Ellwood B. Moore, and Lyle K. Sowls. Wildlife food patches in southern Wisconsin, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 60-69, 2 tables.

Authors' abstract: "Ninety food patches of 30 grains were offered during four years, and their consumption by wildlife deduced from tracks, flushing, observation from blinds, and stomach analyses. The authors conclude that desirable summer and fall foods must be palatable and easily lodged; winter foods must be stiff-stemmed and unpalatable enough to escape earlier exhaustion; spring foods must be unpalatable and easily lodged so as to remain protected by winter snow. The 30 grains are classified according to these criteria, and according to their value to quail, pheasants, and winter songbirds. Their phenology is recorded in tabular form. A key is given for the design of composite patches which combine the properties needed at various seasons. Some grains show a different palatability when offered on the stalk than when exposed as shelled grain in hoppers. Consistency or inconsistency with hopper tests is pointed out." Bibliography of 9 titles.

Management: Field borders

Davison, Verne E. Putting eroded field borders to good use, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 224-225, 2 figs.

The Soil Conservation Service has been developing methods of vegetating field borders and "It is hoped that crops and woodlands at last can be made to live together as good neighbors, with benefit to farm wildlife, in those parts of the country where farms once were carved out of the primeval forest." In the Southeast, particularly, trees tend to encroach upon the fields and their roots draw food and moisture from the field border so that commonly there is a marginal zone on which it is impossible to produce profitable cultivated crops. Frequently enough is spent on fertilizer and seed to pay for establishing cover that would effectively protect the soil and provide almost ideal wildlife habitat. Details are given of the damage and of its treatment, including planting shrubs in the edge of the woodland and Lespedeza sericea and other herbs on the field border. To discourage encroachment by weeds, the field border may be disked.

Management: Forest management and wildlife management

Edminster, Frank C. Improving farm woodland for wildlife, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), pp. 212-214, 223.

Wildlife is a woodland crop that may be profitably maintained by the farmer. Suggestions are made for management beneficial in relation to trees, wildlife, and erosion control. To preserve edge effects, no point within a woodland should be more than 300 feet from a margin. Variety in vegetation should be sought and succession allowed for. Cover should be provided by plant-

ing or other methods, and food production encouraged by liberation of useful species, selective cutting, or planting. Devoting field borders to shrubbery promotes the edge effect and increases food and cover, besides benefiting both crops and woods. Specific recommendations are given for a hypothetical case in the Northeast where the ruffed grouse, gray squirrel, cottontail, and small birds are to be encouraged.

Management: Forest wildlife

Ackers, C. P. Practical British forestry (Oxford University Press, Amen House, London, E.C. 4, England, $4.00 a copy), xviii+387 pp., 14 pls., 14 figs., tables, 1938.

Part (pp. 139-157) of chapter 4 describes damage by vertebrates: black game and capercailzie eating terminal buds and transplanted seedlings of conifers; roosting starlings bending over the tops of young trees and fouling the soil with their droppings; squirrels consuming seed and girdling trees near the top; deer nipping off the leading shoots of young trees; mice and voles eating bark; hares devouring tips of transplants; and rabbits damaging both softwoods and hardwoods. In each case, control measures are suggested.

In chapter 5 on Nursery Work, attention is given to the destruction of seeds and seedlings by larks, tits, mice, and moles; together with control methods.

Chapter 9 discusses Sport and Modern Forestry. Despite the shading out effect of maturing plantations, "The private landowner can, by judiciously mixing high forest conifer stands with high forest broad-leaved trees and efficiently run coppice areas, still ensure a maximum yield of high class sport from his estate." Gamekeepers usually hostile to forestry, workmen and farmers apt to poach; all must be coordinated under competent estate managers. Suggestions for management to favor game in woodlands in thicket, pole, and mature forest stages. Remarks also on marginal coverts, coppice, small forests, and strip plantations. How to bring birds to the guns in high forest woodlands. Covert plantings receive special attention and a list is given of recommended plants according to height classes. Under shady pure stands where live cover plants cannot be successfully grown, artificial dead cover can be substituted; directions are given. Use of willows in improving wet grounds, and formation of partridge driving belts also are discussed. The author concludes that "a combination of well-chosen covert plants, artificial dead cover, and well-placed stops will make shooting in high forest every bit as easy to arrange as in the old-fashioned standards with coppice."

Management: Forest wildlife

Anon. Virginia's wildlife future, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 27(5), Sept.-Oct. 1938, pp. 86-87, 94, 1 drawing, 1 map.

Recent legislation by the Virginia General Assembly authorizes cooperation of the State Commission of Game and Inland Fisheries with the U. S. Forest Service in improving the fish and game resources of the State. The present con-

dition of the forest lands is described and plans and cooperative arrangements are outlined in some detail. "The three immediate objectives are: (1) Restocking the area with wildlife and fish; (2) protection; (3) improvement of the environment. These will be accomplished and supplemented in the long run by seven major efforts: To effect, insofar as possible, a natural balance of all wild birds and animals; to maintain sufficient breeding stock of all species so that there will be provided the maximum surplus of game animals, fur bearers, birds and fish for annual harvest by sportsmen and trappers on a sustained basis; to increase and stabilize the carrying capacity by improving the environment; to maintain animal populations not to exceed the maximum natural carrying capacity of any one species; to effect and maintain wildlife populations in harmony with all other forest users; to protect and preserve the aesthetic value of wild animals and birds of both the game and non-game species; and last, to control the number of undesirable species where and when it is necessary to effect a good ecological and biological balance."

Management: Forest wildlife

Melis, Percy E. The relationship of the Forest Service to game management in Idaho, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 4-9.

After discussion of the functions of Federal and State governments and their administrative agencies under the American system, the author makes this statement about his organization, in particular: "The Forest Service is a land-managing agency and as a land manager is vitally interested in all of the resources and in all of the forms of life--flora and fauna--that are present on national forest lands. The soil and water, the timber and forage, the fur and game, the fish and fowl, and even the scenery and solitude are resources of the national forests. Good forest administration requires correlated consideration of each and all of these items in management activities." There is some overlapping of functions with respect to wildlife but cooperative effort has thus far prevented any serious conflict in Idaho. Suggestions have been made that authority be centralized but the author recommends continuance of the existing system. "The Forest Service is definitely committed to a policy of cooperation with the state authorities and has no plan or desire to supersede any state authority in game management. The Forest Service insists, however, that wildlife in the forests be managed in accordance with the natural laws governing its existence and that other resources be protected."

Management: Forest wildlife

Varner, I. M. Special game problems in the national forests of southern Idaho, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 9-11.

The great difficulty is shortage of winter range. Feeding animals on that range aggravates overbrowsing, is too expensive to continue indefinitely, and is otherwise undesirable. Maintenance of refuges characteristically results in overpopulations. The animals usually do not move out of the refuges prior to the hunting season, hence the kill is small, averaging about 10 percent; in exceptional years, it may reach 50 percent. Game cannot be properly managed under such conditions. Other problems are more briefly mentioned. "One of the most

needed things at the present time is a state game law under which it would be possible to take prompt action in managing all game wherever the need arises. Most certainly we wish to produce more game, but before we do so we must provide for its maintenance, and in the meantime we must properly provide for and manage what we now have."

Management: Fur animals

Anon. Fur bearers best managed as one group, Michigan Conservation (Dept. of Conservation, Lansing, Mich.), 8(2), Oct. 1938, p. 10, 2 photos.

Because their furs are prime at about the same time and because all are taken by about the same methods. Trapping on land controlled by individuals is likely to be best managed. It should have regulative aspects as building up populations when prices are low or reducing them when the animals threaten to do harm. Placing any fur animal on the unprotected list is poor practice as it jeopardizes the protected species. When all are protected and damage occurs, relief can be afforded by permit to trap out of season.

Management: General

Leopold, Aldo. Game policy--model 1930, Bird-Lore (1006 Fifth Ave., New York, N. Y., 30 cents a copy), 41(2), March-April 1939, pp. 94-95, 97.

Review of the American Game Association statement of policy of 1930 and comparison of the situation then and now with respect to the following "basic actions": (1) Extend public ownership and management of game-lands; (2) recognize the landowner as the custodian of public game on all other (i.e., non-public) land; (3) experiment with ways to bring land, farmer, and sportsman together; (4, 5) train men. Find facts; (6) recognize the protectionist and the scientist as sharing the responsibility for wild life; (7) provide funds. The greatest single gain since 1930, the author thinks, "lies in the growth of detail in the idea that resources are interdependent." He illustrates this by discussion of the relations of game and predators. Overpopulations of browsing animals prove the need of predators. Moderate losses whether due to hunting or predation have no effect upon average populations. "In predation, however, there is some kind of automatic adjustment that tends to keep losses moderate. I wish we could claim the same for gunpowder." Self-regulation of some populations is mentioned.

Management: General, Ohio

Chapman, Floyd B. Recommendations concerning wildlife management in southeastern Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release No. 98, 16 pp., mimeographed, Oct. 1938.

Condensed from an 800-page research report based on 4 years of research, this paper lists accomplishments in management of wildlife on Ohio public lands 1935-38 and gives numerous administrative recommendations. Wildlife management suggestions relate to controlled hunting; refuges, sanctuaries, and safety zones; food, cover, and water development; and to various animals, including gray squirrel, deer, bear, raccoon, skunk, fox, woodchuck, rabbit, ruffed grouse, and other upland game birds, shore birds, and waterfowl. Bibliography of 16 titles.

Management: Harvesting

Hicks, Lawrence E. A survey of hunting by permit holders of controlled hunting associations, Wood County, Ohio, 1937, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 90, 14 pp., 4 figs., 12 tables, mimeographed, Aug. 1938.

"The controlled hunting system is essentially a democratic and non-profit one. It provides good hunting for more sportsmen--not less. x x x [it] provides an orderly harvest system without abuses, safeguards the seed stock, and creates ideal sportsmen-landowner relationships. It includes active participation of the landowner in both the production and harvest of the crop." The leaflet reports on the participation and experience in the harvest of 3 classes of hunters, rural and non-rural residents, and visitors. The statistics relate to man-hours of hunting, to bags of pheasants, Hungarian partridges and rabbits, percentage of hunting done and of game killed on various days of the season, participation by the various groups, crippling losses, and illegal kill (hens). The material is presented in tables and graphs, and in 20 summary paragraphs. Bibliography of 16 titles.

Management: Harvesting farm game

Leedy, Daniel L. A survey of hunting by farmer-landowners in Wood County, Ohio, in 1937, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 80, 15 pp., 3 figs., 5 tables, 4 maps, mimeographed, Feb. 1938.

About half of the male farm residents are hunters, the proportion being highest where game was most abundant. Statistics are given of the kill of pheasants, Hungarian partridges, and rabbits, and there is some information on crippling losses in the first group. The number of birds taken decreased almost regularly during succeeding days of the open season. Results and hunting pressure are analyzed, graphed, and mapped. Hunting pressure is severe and the question is asked whether it accounts, at least in part, for the lack of increase in the number of pheasants.

Management: Harvesting pheasants

Burroughs, R. D. An analysis of hunting records for the Prairie Farm, Saginaw County, Michigan, 1937, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 19-25, 2 pls., 1 map, 3 tables.

Author's abstract: "The Prairie Farm (8,401 acres) is so isolated by rivers and canals that it is possible to register all hunters, and to determine their success. The survey involved 2,181 man-days of hunting. The average number of hunters per day was 128, which is equivalent to 9 hunters per sq. mile of range. The total kill of male pheasants was 616, which is equivalent to 47 per sq. mile, or 1/ for each 13.6 acres. Sight records indicated a sex-ratio of 1 male to 2 female pheasants. Comparison of the kill per gun-hour on the first three and the last three days of the hunting season indicated that less than half of the cocks inhabiting the area were killed. These data were used for estimating

the total pheasant population on the Prairie Farm at the opening of the hunting season, which was calculated to have been 3,696 birds; or 1 pheasant for each 2.2 acres. Subsequent observations did not disclose any evidence of overshooti

Management: Harvesting pheasants

Leedy, Daniel L. A study of the 1937 hunting season in Wood County, Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 91, 8 pp., 2 figs., 3 tables, mimeographed, Sept. 1938.

"More than 10,000 hunters participate in the yearly game harvest of Wood County--an area of 612 square miles. x x x Pheasants continue to increase [however] in spite of the heavy hunting pressure (17 hunters per square mile). Development of the Ohio Pheasant Refuge System, controlled hunting, excellent law enforcement, and ideal [environmental] conditions are, in a large measure responsible for this increase." Hunting pressure in 2 townships is analyzed, tabulated, and graphed; it is by far the most severe during the first 2-3 days of the season. Comparisons are made also of the amount of hunting on lands managed, and those not controlled by game associations. "The attitude of farm towards pheasants and hunters is more favorable in townships with game protecti associations than in non-organized townships." There are some general observations and a bibliography of 6 titles.

Management: Herd regulation

Edwards, O. T. Report on the 1938 winter deer range survey and deer census, Malheur National Forest, Oregon (U. S. Forest Service, John Day, Oreg.), 31 pp., 5 pls., 5 maps, 4 tables, June 1938; text mimeographed, illustrations multilithed.

Preliminary report on a cooperative (Forest Service-Biological Survey) investigation of an overpopulation problem. The objectives of the survey and t methods and personnel employed are stated. Counts of deer and estimates of the population and carrying capacity are given for all parts of the Malheur Forest and adjacent areas. The better types of range harbored one yearling to every t adults but the average for the whole area was 1:3. Seasonal movements are described and browse plants and food preferences commented on and tabulated. T most important species are bitterbrush, mountain mahogany, snowbrush, and junip The condition of the winter range is described for a number of representative areas. The limiting factor is winter range mostly in private ownership. Contrary to popular opinion sheep compete less than cattle with game. Proper management of grazing is desirable but the deer population also must be managed. Insect and rodent damage to browse plants is mentioned, the former being more important. The effect of predators on the deer herd was of no material consequence. Deer drift out of refuges to some extent but also move into them durin the hunting season. The tendency for the refuge-protected population is to increase to and beyond a safe carrying capacity. "The proper function of a dee refuge is not to act as a permanent and inviolate sanctuary, but is rather to permit a rapid increase in the deer herd until it can support legal hunting. Whenever that objective has been reached, the refuge should be discontinued. When handled in this manner the refuge becomes a valuable tool in game management seeking a stabilized maximum yield."

Two refuges on the Forest are described; both are overstocked. Management problems and suggestions are presented in synoptic form, the publication is summarized, and the following conclusions drawn: "(1) A serious problem of overpopulation exists on the most important units of the winter range; (2) the browse on these areas is severely damaged and the present productivity and carrying capacity is greatly reduced; (3) an immediate reduction in the deer herd is essential to prevent further range damage and a heavy winter loss of deer in the near future; (4) domestic grazing does not materially reduce the game carrying capacity when the range is properly managed; (5) elimination of all livestock from the national forest land would not solve the present deer problem nor would it materially benefit the deer herds; (6) elimination of all big game from private land and the national forests would not materially benefit the livestock industry nor would it eliminate the necessity for proper range practices; (7) the future game producing capacity of the land on and adjoining the Malheur National Forest is dependent upon efficient game management of the area; (8) it is very desirable that a system be devised whereby the land owner possessing winter deer range will in effect trade part of the use of this land to the public for game production in return for the use of public lands for livestock production."

Management: Herd regulation

Olson, A. L. The 'firing line' in the management of the northern elk herd, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 36-42.

History of increase of the Yellowstone elk and of efforts to provide sufficient winter range. "Any plan which fails to provide for the systematic removal of the increase of a herd of animals on any range which is fully stocked must necessarily fail." Account of hunts arranged by cooperation with State officials. Change in personnel interrupted efforts to reduce the herd until the new officials could be educated as to the need--an argument for more stable tenure of office in game departments.

Management: Inventory, fur animals

Wade, Douglas. Economic survey and general inventory of native Pennsylvania fur-bearers, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 10(1), April 1939, p. 10, 1 photo.

Report of progress of an investigation begun in Snyder County but to be extended later. Results from interviewing more than 1,000 families as to their trapping activities and income. The trappers are mostly youths, sell largely to local buyers, chiefly depend upon the receipts for incidental income. The animals most commonly trapped are skunks, muskrats, opossums, and weasels.

Management: Inventory, Wisconsin lakes

Bordner, John S., et al. Inventory of northern Wisconsin lakes, State Planning Board (Madison, Wis.), Bul. 5, 64 pp. (7-3/4 x 10-3/4 inches), illus., many tables, Jan. 1939.

Discussion of aquatic plants includes references to their value as food for ducks and other wildlife. The common food plants of beavers, muskrats, and wild ducks are listed and those of the last-named group tabulated to show the parts of the plant utilized, the favorite habitat of the plants, and their value in providing food and cover. There is a short discussion of predators, includin turtles, birds, and "brush wolves." Lakes favorable for ducks are listed and the leading features of many lakes, including their aquatic vegetation are briefly characterized in tabulations extending over pp. 26-64, inclusive.

Management: Land utilization program

Peterson, Walter A. Wildlife in the land utilization program, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, p. 229.

"The land utilization program of the Department of Agriculture has been concerned primarily with effecting needed adjustments in the pattern of land ownership and land use in distressed submarginal agricultural areas. Four major types of development have been planned and initiated on land utilization project areas: (1) grazing, (2), forestry, (3) wildlife conservation, and (4) recreational facilities." The rather checkered career of the project through 5 organizations is summarized in a footnote; it is now in the Soil Conservation Service. Examples of the work are given as purchase of 32 refuges totaling 722,000 acres for the Biological Survey, reclamation of marsh lands for States, development of quail lands and propagating plants in the Southeast, and of hatcheries for the Bureau of Fisheries; small lakes and ponds have been created for fish production and wild fowl utilization; streams have been improved; and sanctuaries established in cooperation with State governments. A table summarizes accomplishment according to types of development for a 3-year period ending with 1938, inclusiv

Management: Leasing shooting rights

Towns, Homer G. Cash in the rancher's pocket, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 226, 232.

"Though without rights of ownership, in the game itself, the landowner who protects wildlife, and controls ingress to the land occupied by it, is now conceded to have the right to charge the hunter for the privilege of shooting over his holdings." Several examples are given of returns from leases in Texas in 1938, the highest at the rate of 33 cents per acre. Control of grazing and strict regulation of hunting are necessary to the success of these projects. In general game is increasing on the leased lands, decreasing elsewhere. Criticism of commercialization is heard but, "The sportsman who cannot pay the price does not even get the 'free' game; and each season the price reaches a new high because the game population drops to a new low. Actually free hunting passed with free land. It is now a delusion for which we pay a terrific toll in wildlife of all sorts. x x x If we can set in operation a system that will make it worth while for the landowner to practice wildlife management we can without question reverse the present downward trend in farm and ranch game."

Management: Logging in relation to wildlife

Chapel, Wm. L. Wildlife vs. logging, Arizona Wildlife and Sportsman (125 North 2nd Ave., Phoenix, Ariz., 15 cents a copy), 1(1), Jan. 1939, p. 9, 1 photo (on cover of magazine).

Observations on logging operations south of Williams, Arizona, in relation to wildlife. Nothing is said as to whether the loggers were killing wildlife in or out of season--the greatest hazard in connection with cutting operations in some regions. The author, however, thinks that wildlife was little disturbed. His conclusions are: "In any discussion of game there are three essentials to be considered, namely; food, water, and cover. Naturally, logging affects these, as does any force which disturbs the forest. Under modern conservative logging methods the food supply is increased, the water supply is not affected, and cover is increased tremendously. Whenever game is in an area, some factor decides the maximum number, and is thus the limiting factor. If water was the limiting factor before logging, the total number of game animals would be unchanged, but if either food or cover was the limiting factor and these are increased by logging, the restriction is raised and the number may increase until stopped by a new limiting factor or the old one raised to a new point. In a wildlife program certain things are done in the forest to aid game in one way or another. It is interesting to note that many of these, such as opening the forest stand to increase the areas of food supply, building brush shelters, building fire lanes, are all done in logging. When the work is done by lumberjacks, the results will be the same as tho the work was done intentionally and for game purposes, and under conservative logging the forest is not opened enough to make deer much more visible while hunted."

Management: Marsh and aquatic plants

McAtee, W. L. Wildfowl food plants. Their value, propagation and management, Collegiate Press, Inc. (Ames, Iowa, $1.50 a copy), ix+141 pp., 17 pls., 4 figs., tables, Jan. 1939.

This book discusses briefly the productivity, food value, and utilization by wild fowl of aquatic plants. The longest chapter treats important food plants by families, giving notes on their variety, recognition, ecology, and use by waterfowl. Chapters are devoted to environmental limitations on the growth of aquatic plants, as illumination, fertility, quality of water, and pollution; to planting suggestions including storing and handling, together with recommendations of plants for particular environments; to construction of ponds for various sites and preparation of planting areas; and to control of undesirable plants and animals. There is also a glossary of vernacular names of wild fowl food plants, a bibliography of 37 titles, and a 15-page index.

Management: Miscellaneous

Anon. North Carolina wildlife conservation (Division of Game and Inland Fisheries, Raleigh, N. C.), 2(11), Nov. 1938, 15 pp., 4 photos; 2(12), Dec. 1938, 15 pp., 4 photos; 3(2), Feb. 1939, 15 pp., 4 photos; 3(3), March 1939, 15 pp., 4 figs.

November. In an article on Conservation Education, it is emphasized that the public must be enlightened if wildlife is to be preserved. Hunting exploits seem to have more news value than management procedures, but the hazards of extinction and the means of conserving wildlife must be brought home to the people. Sporting magazines concentrate on game species and other agencies dwell on specific topics to the neglect of general conservation. The only remedy is to teach it in the schools of all grades. The economic, esthetic, and recreational values of wildlife have a natural interest to youth which should be appealed to in an effort to make them good conservationists.

December. The great response of gray squirrels to provision of nest boxes (kegs, and sections of hollow logs) and food on a North Carolina farm is noted. Birds nested successfully in the same area, only one nest of 9 found being destroyed. House cats were deadly enemies of the young squirrels. The surplus population of squirrels migrated to nearby woodlands.

February. An article on game as a crop emphasizes that good distribution of food and cover is just as important as adequate quantity. As a rule it is not difficult to provide desirable interspersion on North Carolina farms, but "clean farming" apparently on the increase is a menace that must be met. In a brief sketch relating to ditch banks, it is pointed out that these are often important as wildlife highways, and it is urged that cleaning them be restricted to one side at a time, or to blocks with areas between them left undisturbed.

March. Notes on destruction of wildlife by automobiles with plea for more care by drivers. Suggestions as to the placing, preparation, and planting of food patches with list of 18 recommended plants and dates and rates per acre of sowing. In a discussion of estimating quail populations, the counting of whistling cocks is said to be useful only in spring and of no real value in forming estimates. Trapping is impracticable, and the most feasible method for the average landowner seems to be counting of coveys and roughly estimating the number in each during February and March. There are notes on possible densities of quail population and on safe harvest proportions. In an article on the wood duck by J. W. Kestler, are quoted observations on these birds eating acorns dropped into water by squirrels, and of a mother wood duck carrying her young singly from the nest to water on her back.

Management: Miscellaneous

Ruhl, H. D. Game Division. Ninth Biennial Rep. Dept. of Conservation, State of Michigan (Lansing) 1937-1938, pp. 191-254, 1 pl., 1 map, 21 tables.

About 22 pages of this report are devoted to deer; they cover in part the same material as Bartlett's paper (abstracted elsewhere, pp. 20-21, in this issue of WILDLIFE REVIEW) but also supplement it. Phases of the subject treated are history of the Michigan deer herd and its food supply, summary of present conditions, crop damage by deer, experiments with electric fence, feeding experiments, food and cover plantings, release cuttings, yarding conditions, and pathology. Progress in re-establishment of the moose and elk is reported. Under the head of small game is discussed the bad effects of drainage, especi-

ally on muskrats; decline in the cottontail population (best remedy--reduction in amount of hunting); the ruffed grouse cycle now on the upgrade (more hunting can be permitted), and management and other studies of this bird; planting of sharp-tailed grouse; status of the Hungarian partridge; the closed season on squirrels; and wildlife investigations on the W. K. Kellogg Sanctuary and other areas. A report on cooperative study of the food habits of predators gives definite information on 5 species: coyote, wolf, red fox, mink, and otter. The fur crop continues to rank with several of the more important agricultural commodities and three-fourths of it is produced on the better agricultural lands. Information is given on public shooting grounds, wildlife sanctuaries, State game farm, roadside zoos, cooperative farm-game program, and extension activities, and there is a summary of the status of the principal fur and game species of the State.

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WILDLIFE REVIEW

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Washington, D. C. No. 21 May, 1939

Management: Planting

Anon. Permanent food and cover planting for wild life, Minnesota Dept. of Conservation (St. Paul), 3 pp. (8-1/2" x 12"), 3 pls., multilithed, April 1939.

Preparing such facilities is "the most necessary work to be done in Minnesota for the better conservation of valuable wild life." The leaflet recommends triangular plantations (apex to the north), describes their advantages, and suggests planting arrangement and species selection. The illustrations clarify the suggestions.

Management: Planting

Bennett, J. M. Specifications for trees and shrubs, Parks & Recreation (327 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(3), Nov. 1938, pp. 100-110, 6 photos.

The information in this article should be helpful to anyone having the responsibility of placing large orders for woody plants. Suggestions are made as to preliminary communications with bidders and as to the form of contracts, besides those relating to specifications for the plants and stipulations as to their handling.

Management: Planting

Connors, Charles H. Woody plants with ornamental fruits, New Jersey Agr. Expt. Sta. (New Brunswick) Circ. 380, 23 pp., 6 pls., October 1938.

With the exception of a short paragraph on birds in the garden, this publication does not treat wildlife directly. It contains, however, considerable information that may be useful to the wildlife manager. Tables of trees and shrubs with fleshy fruits indicate the height of the various species, the color and season of their flowers and fruits. Much the same information is given for vines, and there is supplemental data on other plants with interesting flowers or pods.

Management: Planting

Pearson, A. M., and J. W. Webb. Planting food crops for game birds, Alabama Polytechnic Institute (Auburn, Ala.) Agr. Expt. Sta., 5 pp., 3 figs. 1 table, mimeographed, March 1939.

Directions as to where, what, when, and how to plant, with table of 14 crop plants showing season of availability of the seeds and their utilization by bob-whites and doves.

Management: Planting

Shepherd, Harry W. Woody plants for landscape use in California, California Agricultural Extension Service Circ. (University of California, Berkeley) 109, 48 pp., 15 figs., 3 tables, Aug. 1938.

Besides general instructions, this publication includes tables listing native and exotic trees, shrubs, and vines suitable for California conditions.

Management: Planting

Wyman, Donald. Hedges, screens, & windbreaks (McGraw-Hill Book Co., 330 West 42nd St., New York, N. Y., $2.50 a copy), 249 pp., illus., 1938.

This volume treats more than 250 plants that can be used for hedge or screening purposes. There is an alphabetical descriptive list, with notes on use, care, and hardiness (indicated by figures referring to zones on maps at both the beginning and the end of the volume). The uses of hedges, planting practices, and care after planting are discussed, and there are selections of plants for different purposes as for ornament, protection, screens, windbreaks, and shelterbelts, and for particular regions. Exotic as well as native plants are included.

Management: Planting, Minnesota

Boeglin, Louis. Hardy plants with ornamental fruits in Minnesota, Parks and Recreation (327 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(4), Dec. 1938, pp. 186-188.

Listed according to seasons and colors; a section on plants whose fruits are available in summer and in winter. There are special notes on bittersweet, crab apples, mulberry, mountain-ash, and elders.

Management: Planting, partridge peas

Massey, A. B. Native food plants. The partridge peas, Virginia Wildlife (Blacksburg, Va.), 2(2), Oct. 1938, p. 5.

Cassia nictitans and C. fasciculata. Appearance, value to birds; collecting and scarifying seeds; treating seed with boiling water and sand; sowing.

Management: Planting, shelterbelts

Trenk, F. B. Wisconsin's shelterbelts grow longer, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(4), April 1939, pp. 3-8, 4 photos.

Value of shelterbelts in enhancing crop production; interest of farmers; more than 4 million tree sets distributed from State nursery in 5 years. A secondary value is the added winter cover afforded game birds and animals, more needed now than ever because natural groves on farms are being depleted.

Management: Planting, storage of seeds of aquatic plants

Sharp, Ward M. Propagation of Potamogeton and Sagittaria from seeds American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 28(2), March-April 1939, pp. 87-93, 3 photos.

Large scale methods developed at the Valentine Migratory Waterfowl Refuge, Nebraska, for harvesting, preserving, and planting seeds of Potamogeto pectinatus, P. zosteriformis, and Sagittaria latifolia. The Sagittaria seeds were stored semi-dry and those of Potamogeton wet. Treatments for breaking dormancy of the seeds so as to shorten the period of storage are described.

Management: Planting for birds

Jensen, L. P. Fruit and berry-bearing trees and shrubs, Parks and Recreation (327 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(3), Nov. 1938, pp. 116-118.

"Birds add greatly to the charm of any landscape, and by providing them with proper food and shelter we may be sure of their abundance." Native and exotic trees and shrubs useful in Missouri are listed together with informatic as to the color of their fruit and as to their bearing season.

Management: Planting for wildlife; muskrats

Gillese, John. Muskrat farming, Hunter-Trader-Trapper (386 South 4th St., Columbus, Ohio, 15 cents a copy), 78(1), Jan. 1939, pp. 49-50.

Consists mainly of statements about the value to muskrats and methods o planting the following: Wildrice, spatterdock, cattail, wapato, sweetflag, white waterlily, pink pond lily, bulrush, wildcelery, and bur-reed.

Management: Planting for wildlife, shelterbelts

O'Connell, Frank B. Shelter belts for wildlife, Outdoor America (1167 Merchandise Mart, Chicago, Ill., 10 cents a copy), 4(2), Dec. 1938, pp. 4-5, 3 photos.

Shelterbelts while planned to increase agricultural productivity are of value also to wildlife. They have the advantage too of being an adjunct to agriculture of which the farmer can approve that is helpful in relation to wil animals. In Texas the usefulness of shelterbelt plantings to wildlife has already been demonstrated and such areas have been used for refuges on coopera tive game preserves. Similar objectives are in view also in other plains States. The nature of the belts, the trees used in them, and the ways in whic they aid crops and wildlife are noted in some detail.

Management: Planting for wildlife and erosion control

Rule, Glenn K. Soil defense in the Northeast, U. S. Dept. Agr. Farmers' Bul. 1810 (Supt. of Documents, Washington, D. C., 15 cents a copy), 69 pp., 39 figs., 1938.

Page 36 is allotted to Wildlife Plantings. Wildlife can survive and multiply only where there is sufficient cover and food. When planting for erosion control, conservationists keep in mind needs of wildlife. A list of shrubs and trees suitable for planting in the region is given.

Management: Pond development

Davis, Cecil N. Utilizing farm ponds for wildlife, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 230-232, 1 table.

Drought in the west stimulating interest in water conservation, facilitated the Soil Conservation Service's program of gully control by impoundment. Not only were water control needs met, but by planting and other special treatment, water supply sites were made into excellent wildlife habitats. Results in Missouri are described. Fencing to exclude livestock is of first importance; the animals can be watered at troughs outside the area being developed. Cover restoration, planting of shrubs and trees for windbreaks and shade, and establishing marsh and aquatic vegetation to control wave action, strain out silt, and bind banks, are other measures employed. Directions for planting are given and the species recommended are listed. The table indicates the utility of 26 groups of plants as silt-strainers, bank-binders, wave-breakers, and spring-inhabitants, and as wildlife foods.

Management: Present trends

Simmons, James R. Feathers and fur on the turnpike, Christopher Publishing House (Boston, Mass., $1.75 a copy), 148 pp., 10 pls., 3 figs., 4 tables, 1938.

2. A study of the present trends in wildlife conservation, pp. 11-12, 95-148. "Wildlife conservation, with its accompanying profession of wildlife management, is emerging as a distinct unit, just as forest conservation with its accompanying profession of forestry emerged some fifty years ago in America." The discussion is by a forester with a sympathetic attitude toward wildlife management. "Forestry practice and wildlife management should develop together." Game technicians and foresters should strive to compromise between extreme points of view. The writer is not in favor of concentrating all Federal conservation activities in one Department. He urges that wildlife management benefit non-game, as well as game, species. Considerable space is devoted to the prospects of correlating forest management and wildlife management, the outlook being, in the writer's opinion, hopeful. On the vexed question of burning, he says: "In the untouched forest Nature had to make some of her openings by the use of fire. Hence, if we want the wildlife in managed forests we must substitute clearings to a reasonable extent" (p. 116). On

another controversial question he writes: "The more it is studied the less enthusiasm can be mustered in favor of the combination public shooting ground and wildlife sanctuary" (p. 116). Activities of arms and ammunition interests, while on the whole commended, are criticized as being too exclusively for the benefit of game species and as putting too much emphasis on "vermin" control. Cooperative research on wildlife is praised. The effect of silvicultural operations upon wildlife are discussed with largely favorable comment. There is a chapter on the training of a wildlife conservationist, and a prophetic postscript entitled, "The Work Ahead." It portrays wonderful opportunities, forecasts great improvement in the relations of mankind and wildlife, and asserts that, "wildlife conservation is on the march."

Management: Refuges

Cox, William T. Marsh firebreaks--a boon to wildlife, American Forests (919 Seventeenth St., N. W., Washington, D. C., 35 cents a copy), 45(3), March 1939, pp. 109-111, 137, 6 photos.

On the Beltrami project, Minnesota, an unwisely drained area, construction of numerous small dams in marginal ditches, protected the area from fire, and held up the water level so that the soil became saturated, and small ponds filled. The response of wildlife has been gratifying, especially in the case of beavers and waterfowl, but all resident species, including deer, elk, caribou, and moose, are profiting. The cost of development did not exceed $1.00 per acre.

Management: Refuges

Gabrielson, Ira N. Range restoration, Bird-Lore (1006 Fifth Ave., New York, N. Y., 30 cents a copy), 41(2), March-April 1939, pp. 63-66, 2 photos.

Restoration of vegetation chiefly due to elimination of grazing domestic animals has been amazing on the Charles Sheldon Antelope Refuge and Range in Nevada and the Hart Mountain Refuge in Oregon. It seems quite probable that a moderate reduction in the number of livestock on many ranges will result in equally rapid recovery. The author is of the opinion "that a large part of the overgrazed lands of the West can be rapidly improved and that the real problem areas are much smaller in extent than we have been led to believe."

Management: Refuges

Manweiler, Jack. Minnesota's "big bog," Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 63, December 1938, pp. 12-13, 24-25, 28, 3 photos; Wildlife management in Minnesota's "big bog," 65, January 1939, pp. 14-15, 23, 27, 5 photos; Woodland caribou in the "big bog," 65, February 1939, pp. 16-17, 23, 30, 4 photos. Evidently there is an error in the serial numbers.

December. The big bog is an unsuccessfully drained area of about 2,000,000 acres in northern Minnesota. It is the site of the Beltrami and

Pine Island land utilization projects. The first installment describes the tract and some of the things done to develop it, and gives general information on the wildlife present.

January. This part comments briefly on work with a variety of animals. Banding, population, and disease investigations of snowshoe hares are in progress; a new filarial parasite has been discovered. Transplanting and artificial feeding of beavers have been undertaken and a means worked out of identifying beaver blood as a clew to poaching. Creating of ponds both by impoundments and excavations (blasting) have improved the habitat for moose; Bang's disease, an important livestock malady, was identified in one moose. A nervous disturbance called moose disease also is reported upon. Parasites of elk, starvation of deer, control of wolves, study of game birds, and food and cover planting also are discussed.

February. Account of the dwindling caribou herd and of the capture and transportation of Canadian animals to restore it. The subject is treated in other articles by the same author abstracted elsewhere (pp. 11, 12) in this issue of WILDLIFE REVIEW.

Management: Refuges

Rutledge, Archibald. Private game preserves, Farm Journal (Washington Square, Philadelphia, Pa., 5 cents a copy), July 1938, p. 7. Also in Conservation (919 - 17th St., N. W., Washington, D. C., 20 cents a copy), 4(5), Sept.-Oct. 1938, pp. 33-34.

Hunters are so numerous that in the author's opinion it will soon be necessary for success to go to a wilderness or join a club which controls a private game preserve. "I surely see this day coming if every landowner on whose property any game has its range does not set aside a certain part of his property as an inviolate game refuge." Illustrations of the value of such refuges are given.

Management: Refuges

Wakeman, Max. Wildlife laboratories--the game refuges, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(3), Nov. 1938, p. 10.

Though hunting is prohibited on some and closely restricted on others of the State game areas, they, nevertheless, contribute to the improvement of hunting by serving as testing grounds for a variety of experiments. The research program is outlined, and classification of the areas (20 in number), their location and combined acreage stated.

Management: Refuges for pheasants

Leedy, Daniel L. What constitutes a good pheasant refuge?, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 85, 4 pp., mimeographed, Jan. 1938.

Summary of extensive Ohio experience with areas managed to populate surrounding territory by overflow or to produce stock that is trapped and moved elsewhere. As to size, a refuge of 200 acres largely in crops, but including 40-60 acres of woodland will winter 2,000 pheasants. Because of the risk of crop damage, it is usually inadvisable, however, to maintain populations of more than 150-200 birds to the square mile. It is important to take farmer sentiment into consideration in selection of a refuge site. A central, and 4-5 scattered auxiliary, refuges to a township are recommended. They are safer for the birds if remote from main highways. Large acreages of grain crops succeeded by weedy stubble are necessary, and there must be plenty of well distributed cover. Winter roosting sites may be in woodlots, thickets, or fields of old sweet clover or weeds. Sites in which pheasants can nest undisturbed are very desirable. Fox squirrels and rabbits compete for food but do not otherwise interfere with pheasants, but large populations of raccoons, skunks, opossums, weasels, hawks, and crows may be harmful and require control. "However, the most important predator control is that directed against men, cats, and dogs."

Management: Salting

Case, George. The use of salt in sparing winter range on the Selway, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 27-29.

This material has previously been abstracted from 2 sources; see WILDLIFE REVIEW, No. 15, July 1938, pp. 28, 35.

Management: Seal, Fur

Bower, Ward T. Alaska fishery and fur-seal industries in 1937, U. S. Bureau of Fisheries, Administrative Report 31 (Supt. of Documents, Washington, D. C., 15 cents a copy), 150 pp., 1938.

Notes on protection of walruses and sea lions. Take of whales, the first under the international treaty for the regulation of whaling, was slightly in excess of that for the previous year. The status and utilization of blue foxes and reindeer on the Pribilof Islands are discussed and there is a 25-page report on the fur-seal industry. The herd numbered more than 1,800,000 and the take of skins was 55,180. The full account of a computation of the fur seals by sexes and age classes, with remarks on mortality at sea, and suggestions as to management, is by Harry J. Christoffers.

Management: Seed, breaking dormancy of Crataegus

Flemion, Florence. Breaking the dormancy of seeds of Crataegus species, Boyce Thompson Inst. (Yonkers, N. Y.) Contributions 9(5), July-Sept. 1938, pp. 409-423, 2 figs., 7 tables.

Materials, methods, and results are described and tabulated. "All Crataegus seeds have dormant embryos which must be subjected to a period at low temperature in a moist medium before germination occurs." A separate inhibiting coat-effect in some species can be overcome by treatment with acid and high

temperature. "By proper treatment seedlings of all Crataegus species studied can be obtained on a large scale the first spring after the seeds ripen." Bibliography of 11 titles.

Management: Soil conservation in relation to wildlife

Fox, Adrian C. Annual crop buffer windbreaks, Dakota Farmer (The Bushnell Co., Aberdeen, S. Dak.), March 11, 1939, pp. 96-97, 3 photos.

Corn, millet, sorghum, and sunflowers planted in long rows on field borders and on contours to decrease wind erosion and hold drifting snow proved to be of considerable value in providing travel lanes, cover, and food for both native and introduced game birds. The utility of conventional food patches with a greater variety of both tall and low growing seed producers also is emphasized.

Management: Soil conservation in relation to wildlife

Holt, Ernest G. Birds and beasts aid erosion control, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 28(2), March-April 1939, pp. 79-86, 5 photos.

Popular account of wildlife benefits due to erosion control practices as revegetation, control of grazing and fire, strip cropping, terracing, and soil protection on areas not under cultivation.

Management: Soil conservation in relation to wildlife

Turner, L. T., and A. B. Hatch. The influence of soil conservation practices on upland game birds on Idaho farms, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 67-69.

Most practices that favor soil conservation also benefit game. Control of hunting and predation, even if supplemented by restocking, mostly has failed to maintain abundance of game but success has come from adding to these, environmental development. Soil conservation practices now used in Idaho produce optimum conditions for Hungarian partridges and ring-necked pheasants. Suggestions are given for dry farms, irrigated lands, and cattle ranges.

Management: Spraying wild fruit

Chapman, Floyd B. Use of chemical sprays to increase yields of fruits utilized by wildlife, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(2), April 1939, pp. 141-143, 1 table.

Author's abstract: A survey of natural wildlife foods and factors controlling their production in southern Ohio indicated that certain insect pests and fungus diseases, some of which attack domestic fruits also, are responsible for decreased palatability, premature abscission, decay before ripening, or complete destruction of wild fruits. The wildlife manager might profitably

utilize certain chemical sprays, especially in managed refuges, in order to improve the yield and quality of certain fruits and to prolong their availability into critical periods. The use of a lead arsenate spray on two species of wild grapes (Vitis aestivalis and V. labrusca) gave excellent results in controlling the grape berry moth. Vines treated with two applications of a spray prepared by dissolving 4 level tablespoonfuls of lead arsenate in one gallon of water with a soap spreader retained their fruits until midwinter when they were most useful to ruffed grouse, songbirds, and certain mammals."

Management: Stocking

Allen, Durward L. Nature versus the incubator, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(4), Dec. 1938, pp. 4-5, 8-10, 3 photos.

Reproductive potential is such that any species unchecked would soon overrun the earth. "This fact is vital in comparing the rate of natural reproduction to the possibilities of artificial propagation. Even if we spent the last penny of all available game funds we could not artificially propagate as many animals of any species as would be reproduced naturally, under favorable conditions. Artificial propagation is inevitably limited by financial cost and many other practical considerations, and the number of animals that can be reared artificially is but a fraction of the number that can be reached in natural reproduction. From this it reasonably follows that if the natural production of a species is continuing normally and still the amount of game is deficient, there is little hope of creating an abundance through artificial propagation. That would be like pouring a teacup of water into a hole down which a barrel already has been poured. Plainly, attention needs to be given to that other essential consideration--percentage of survival--and an investigation be made of the habitat."

Habitat must be favorable if restocking operations are to succeed and nothing is accomplished by stocking beyond carrying capacity. References are included to illustrative findings in Pennsylvania, Wisconsin, and Minnesota, and description of hypothetical examples of useless restocking. Stresses the need of more detailed knowledge of all the factors involved but ends by saying, "One conclusion seems quite clear. If we persist in reducing the carrying capacity of game range by the destruction of cover and continue other damaging practices, and then proceed to overshoot these maltreated areas, we can release imported or coop-reared game into them indefinitely without gaining anything but experience."

Management: Stocking

Hatch, A. B. The refuge trapping system of pheasant management, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 60-63, 1 table.

Reviews Connecticut and Pennsylvania experience as to the relation of stocking of pen-raised pheasants to the hunting kill and says: "The truth is that birds which are raised in the wild at no cost to the state apparently provide the bulk of the hunting kill, and the larger the release program,

although the cost per bird may be lower, the less effective become the dollars spent in artificial propagation. In recognition of this situation, most states, which have been studying these problems for a number of years, have finally directed their major attention to methods for increasing the success of wild propagation. One of the most successful techniques found so far has been the so-called refuge trapping system." Ohio and Idaho illustrations are cited which show that this system is highly efficient and economical.

Management: Stocking caribou

Manweiler, John. Woodland caribou study in northern Minnesota, Parks and Recreation (527 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(2), Oct. 1938, pp. 74-78, 2 photos, 1 map.

Decline of the Minnesota herd to 4 individuals. Reasons: Limited range, lack of winter food, drowning of young in drainage ditches, poaching, parasitism and disease, inbreeding and sterility, and lack of calving range. List of 20 foods in the order of their preference in March and April. Environmental conditions have been improved and predators combatted. Ten individuals from Saskatchewan have been brought in, and kept in an enclosure of electrified fencing to serve as the nucleus of a herd, which it is hoped can be protected and will increase.

Management: Stocking cottontail

Hickie, Paul. Rabbits--and some of the costly myths about restocking them, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(6), Feb. 1939, pp. 4-5, 8, 10-11, 2 photos.

Review of experience, particularly in Pennsylvania and Ohio, and conclusion that there have been no beneficial results, and that neither importation nor propagation of rabbits has been demonstrated to be financially justifiable. The parallel to pheasant management inferred by sportsmen is false for the vital reason that eggs and young of pheasants can be handled by machines while the young of rabbits can be cared for on any extensive scale only by their mothers in the wild. The author comments, with respect to pheasants also that "once the state is populated there is little that can be done with game farm stock to build up the wild population." See also abstract under Diseases and Parasites: Tularemia a bar to importation of rabbits, in WILDLIFE REVIEW, No. 19, April 1939, p. 24.

Management: Stocking game birds, Pennsylvania

Wessell, Chas. M. The chukar partridge, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(12), March 1939, pp. 10-11, 31, 3 photos.

Discussion of the chances of success, and account of experiences to date, with this species. Of exotic birds already tried, the ring-necked pheasant is well established, the Hungarian partridge is still on trial, and the Reeves pheasant has proved unsatisfactory.

Management: Stocking pheasants

Wessell, Charles W. The six-week old pheasant program, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(10), Jan. 1939, pp. 4-5, 30, 6 photos.

Directions for rearing pheasants received at the age of six weeks, including description and illustrations of holding pens; and instructions for care and feeding, netting and handling birds; treatment of diseases and vices; and for liberating the birds.

Management: Transplanting elk

Bagley, Lester. History of the Big Horn Mountain elk herd, Wyoming Wildlife Magazine (Game and Fish Department, Cheyenne, Wyo.), 3(11), Nov. 1938, pp. [1-3], 1 table, mimeographed.

Methods and cost of transferring elk from Jackson Hole to the Big Horn Mountains. Steady growth of the herd in the new environment tabulated. Animals were first moved in 1910 and open seasons have been allowed since 1925.

Management: Trapping caribou

Manweiler, John. Woodland caribou from Saskatchewan , Parks and Recreation (327 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(3), Nov. 1938, pp. 134-138, 3 photos.

The successful method was snaring with quarter-inch rope, which is described in detail. Eighteen caribou and one moose were captured of which 11 escaped. Recommendations for transportation and care based on experience are made.

Management: Trapping prairie grouse

Homerstrom, F. N., Jr., and Millard Truax. Traps for pinnated and sharp-tailed grouse, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass., 75 cents a copy), 9(4), Oct. 1938, pp. 177-183, 5 figs.

These birds are difficult to entice into traps and to guard from injury through all phases of trapping. Wire-netting was finally abandoned almost entirely in favor of soft materials. Funnels, buffers, and other details of construction are described and illustrated for 5 types of traps. Directions for baiting and operating the traps also are given.

Management: Wildlife on the range

Compton, Lawrence V. Wildlife and the range, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 215-217.

The western range comprises lands supporting primarily forage and browse plants which are used mainly for production of livestock; they amount to some 728,000,000 acres, or 40 percent of the land surface of the United States. Cultivation affects only about 4 percent of the range; its effects upon wildlife are about equally detrimental and beneficial. The range continues to be the main reliance of the principal native species of wildlife and range deterioration seriously affects them. Control of environment for erosion prevention has a counter effect. Retirement of submarginal lands, regulation of grazing elsewhere, and conservation and development of water supplies are some of the remedies. Examples are cited of the benefits to wildlife resulting from their application. The financial returns arising from the presence of wildlife are summarized. From all points of view, it is desirable that wildlife be managed as one of our valuable renewable resources.

Management: Winter feeding

Bailey, Robeson. Old John needs a hand-out, National Sportsman (275 Newbury St., Boston, Mass., 10 cents a copy), 81(1), Jan. 1939, pp. 9-15.

Need of winter feeding of game birds where considerable snow falls. Recommends wide distribution in small quantities (3-5 lbs.) to avoid concentrating birds and thus attracting predators. The food benefits numerous forms of wildlife besides game birds and supplying it gives an interest in upland gunning that shooting alone can never yield. A corn and oystershell mixture was used.

Management: Winter feeding

Miller, Fred. Upland feed, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 62, Nov. 1938, pp. 13, 32, 2 photos.

"Complete elimination of artificial feeding of Minnesota's upland game birds is the goal." Experience with costly feed purchasing revealed that winter feeding is less than 15 percent efficient, that rabbits and other mammals consumed a large portion of the feed, and that predators took toll of the birds concentrated at feeding stations. Planting of black amber cane and millet by farmers is the chief reliance now. Seed is furnished by the Department of Conservation, the farmer cuts and shocks the grain but leaves part of it in the field over winter. He shares in the grain crop and gets all of the fodder. Food-producing trees are being planted on refuges, but later will be supplied for use elsewhere. The new practices have resulted in considerable savings. In 1938, 3,984 acres of cane and 2,368 of millet were planted, averaging, respectively, 52-1/2 and 31 acres per county.

Management: Winter feeding, squirrels

Chapman, Floyd B., and Luther L. Baumgartner. Winter feeding of squirrels, Ohio Conservation Bul. (Ohio Conservation Division, Columbus, 5 cents a copy), 3(2), Feb. 1939, pp. 6-7, and inside back cover, 2 figs.

Winter feeding, to be really valuable, must be definitely planned and faithfully carried out. To correspond with the range of fox squirrels there should be one feeding station to each 25 acres. Feeding apparatus is illustrated and foods recommended, as black walnuts, raw peanuts, and corn. A table shows percentages of digestible nutrients of 10 possible squirrel foods. Directions are given as to where and how to place winter foods.

Management: Winter range

Olsen, Orange A. Winter range as a limiting factor in big game management, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 20-22.

In general the areas most intensively occupied by man were the winter ranges of Idaho's big game. The subsistence resources for wildlife must be available at every season as needed, but there is a weak link now in the chain, namely, dearth of suitable winter range. The national forests include chiefly mountainous country and but little foothills to which big game formerly migrated in winter. In severe seasons, about 45 percent of the animals now leave the forests and many die. It is hoped under the Taylor Grazing Act and the Pittman-Robertson Act for Federal aid in wildlife restoration to make additional winter range available. It is around such range that management must revolve.

Minnesota: Annual report, Department of Conservation

Speakes, Harry E. Division of Game and Fish. Minnesota Dept. of Conservation (St. Paul) Ann. Rep. 1938, pp. 40-99, tables, 1939.

Contains estimate of the total value, and annual harvest value, of the principal species of game and fish of the State, at $24,500,000 and $4,561,989, respectively. Minnesota has the largest area of game refuges of any State--a total of 185 covering 3,411,450 acres. Black amber cane and millet food patch planting was continued in many counties, aggregating more than 6,000 acres. A tabulation of the game kill for 1936 and 1937 is presented; migratory waterfowl numbered more than 1,300,000 and made up more than half of the total head of game taken. The report includes statistics on the population and kill of deer on State and national forests, and estimated total bag of deer each year from 1932 to 1937. There are notes on the status of the moose, elk, and caribou, parasite and disease investigations, and on food habits of several species. Analyses of the contents of 54 stomachs of mourning doves revealed weed seeds as the most important elements of the diet, 5 species making up 87 percent of the food. A graph shows the chief results of study of 659 stomachs of ring-necked pheasants; grains outrank other foods. There are less detailed notes on dietary studies of the ruffed grouse, foxes, skunk, hawks, and cormorants.

Natural History: Birds, Allegany State Park, N. Y.

Saunders, Aretas A. Studies of breeding birds in the Allegany State Park, New York State Museum (Albany) Bul. 318, 160 pp., 77 figs., tables, Dec. 1938.

Description of the area and of its forest types; tabulation of breeding birds according to habitat for 3 years, 1932-1934. Annotated list of the species, summary, and bibliography of 42 titles. The average number of pairs of birds on 225 acres for the 3 years was 173. The red-eyed vireo and black-throated green warbler were the most common forms.

Natural History: Birds of Tennessee

Wetmore, Alexander. Notes on the birds of Tennessee, U. S. National Museum (Washington, D. C.) Proc. 86(3050), pp. 175-243, 1939.

Annotated list of 185 species and subspecies based on collections of the National Museum, mainly those obtained by recent expeditions.

Natural History: Birds of Texas

Rutland, Don. Editor. Preliminary check-list. Birds of East Texas, East Texas Ornithology Club (Commerce, Texas), 30 pp., mimeographed, 1938.

List of 215 forms; occurrence, status, and significant dates given.

Natural History: Fauna of Olympic National Park

Cahalane, Victor H. A wildlife picture of Olympic National Park, National Parks Bul. (1624 H St., N. W., Washington, D. C.) 14(66), Dec. 1938, pp. 20-24, 1 map, 1 photo.

The map shows the boundary of the former Mount Olympus National Monument and of the enlarged Olympic National Park, Washington. The text discusses the more prominent animals and the management problems they present. The mule deer and mountain goat have been introduced; the native wolf has been exterminated and coyotes are coming in.

Natural History: Flora and wildlife of Tennessee

Allred, Charles E., Samuel W. Atkins, and Benjamin D. Raskopf. Human and physical resources of Tennessee, III, IV, Flora, Wildlife. College of Agriculture (University of Tennessee, Knoxville) Rural Research Monograph 42, pp. v+32-53 , figs. 1+10-13, May 1937.

General discussion, remarks on regional phenomena (maps), and bibliographies. The text on birds, mammals, and fishes discusses kinds and distribution, values, conservation, and restocking. Treatment of turtles, frogs and toads, snakes, and lizards is briefer.

Natural History: Fur and game mammals of Alaska

Alaska Game Commission. Distribution of game and land fur-bearing animals in Alaska 1938 (Biological Survey, Washington, D. C.). Cover and 25 maps, 1939.

Each map shows the distribution of an animal group by dots representing 100 individuals. The method is not clear for groups entitled to only a few dots or confined to the coast where the dark markings of the map are very prominent--6 instances in all. According to the maps, weasels are the most widely distributed and caribous the most numerous mammals.

Natural History: Indication of age of waterfowl

Ticehurst, Claud B. On a character of immaturity in the Anatidae, Ibis (51 Onslow Gardens, London, S. W. 7, England, 12 shillings 6 pence a copy), Ser. 14, 2(4), Oct. 1938, pp. 772-773.

"Striae", i.e. vertical darker lines on a lighter ground at the tip of the nail of both upper and lower mandibles are present in all downy ducklings and probably in all goslings. A low power lens may be needed to reveal them. In general they seem to fade in the first spring after the year of birth and are gone by the following autumn or winter. In some cases they persist longer but "their presence or absence may be of some help in determining whether a duck or goose in adult dress is a young adult or an old one."

Natural History: Legumes of Wisconsin

Fassett, Norman C. The leguminous plants of Wisconsin (University of Wisconsin Press, Madison, $3.00 a copy), 157 pp., 24 pls., 59 figs., numerous maps, 1939.

This book contains an artificial key to the nearly 100 species of legumes known from the State and keys to the genera based on flowers and fruits. There is also a key to seeds of groups, in some cases, genera, in others, species. There are descriptive and distributional notes for all species, and maps showing the distribution in Wisconsin or even the entire range for many. In addition the work is profusely illustrated with drawings by Professor Richard I. Evans and photographs by the author. A section on epidermal outgrowths with key and illustrations by Catherine Mose suggests that fragmentary material (as from animal stomachs) may be traced to the genera at least by the shape and sculpturing of the trichomes. Included in the book are a glossary and index. The author is well known as a thorough and ingenious taxonomist; as a result, and also in view of the lavish use of excellent illustrations, the work sets a new high in quality for State reports on plants.

Natural History: Mammals of Idaho

Davis, William B. The recent mammals of Idaho (Caxton Printers, Ltd., Caldwell, Idaho, $5.00 a copy), 400 pp., 2 pls., 33 figs., April 1939.

The author's native State is the type locality for 43 species and subspecies of mammals; the complete list comprises 141 forms, of which 15 are widely distributed. The type localities are catalogued and mapped and all collecting stations are annotated in a gazeteer. Other chapters of general import relate to geography of the State (with relief map), floral provinces,

distributional areas, and problems of distribution. The systematic accounts include standard scientific and vernacular names, references to original descriptions, synonyms, descriptive and distributional notes, and records of occurrence. There are keys to many but not all groups, and numerous distribution maps. Several nomenclatorial changes are made and three subspecies described as new. There is a bibliography of more than 9 pages and a detailed index. A thorough work, increasing and summarizing knowledge of mammals in a region important for comprehension of the usonian fauna.

Natural History: Mammals of Quebec

Anderson, Rudolph M. Mammals of the Province of Quebec, Provancher Soc. Nat. Hist. Canada (Quebec) Ann. Rep. 1938, pp. 50-114, 1 map.

Annotated list of 126 species and subspecies. The scientific name and its original reference, and both English and French vernaculars, are given. The bibliography exceeds 10 printed pages.

Natural History: Mammals of Tennessee

Kellogg, Remington. Annotated list of Tennessee mammals, U. S. National Museum (Washington, D. C.) Proceedings, 86(3051), 1939, pp. 245-303.

Account based on National Museum and Biological Survey collections and on the literature, citations to which cover 2-1/2 pages. Eighty-four species and subspecies are included.

Natural History: Papaw

Gould, H. P. The native papaw, U. S. Dept. of Agriculture Leaflet 179 (Supt. of Documents, Washington, D. C., 5 cents a copy), 6 pp., Feb. 1939.

The author says nothing about wildlife, but as papaws are utilized managers may wish to know of this source of information on the name (Asimina triloba) and relationship, range, characteristics, habits of growth, and propagation.

Natural History: Reptiles of Arkansas

Schwardt, H. H. Reptiles of Arkansas, Arkansas Agr. Expt. Sta. (Fayetteville, Ark.) Bul. 357, 47 pp., 53 figs., June 1938.

General remarks on life histories and economic importance of reptiles and on snake myths. Descriptive and distributional notes on snakes and illustrated key to the species. There is a special section on poisonous snakes and treatment of their bites. The lizards receive treatment similar to that of the snakes except that the key is not illustrated; for the turtles there is no key. The number of species included is of snakes, 45; lizards, 11; and turtles, 20. Bibliography of 22 titles.

Natural History: Reptiles of Ohio

Conant, Roger. The reptiles of Ohio, American Midland Naturalist (Notre Dame, Ind., $1.00 a copy), 20(1), July 1938, pp. 1-200, 26 pls., 38 maps.

An exhaustive and well-illustrated work bringing to date information about 39 species of reptiles known to occur in Ohio. The account of each species includes descriptions and measurements, records of specimens examined, statements of general and local ranges (both mapped), and notes on habitat, abundance, and habits. General chapters include a check-list, a key, notes on doubtful records and possible additions, ecological and historical summaries, a bibliography (5 pp.), index, collecting instructions, and suggestions as to first aid in case of venomous snake bite.

Natural History: Warblers of New Jersey

Hausman, Leon A. The warblers of New Jersey. Part 1, Summer resident warblers, New Jersey Agr. Expt. Sta. (New Brunswick) Bul. 646, 48 pp., 20 figs., April 1938.

General traits including food habits, simplified color key, key to songs and 20 specific accounts each of which includes description, and notes on identification marks, habits, song, and local range. A well prepared and well illustrated bulletin.

Natural History: Wildlife of salt marshes

McAtee, W. L. Wildlife of the Atlantic Coast salt marshes, U. S. Dept. of Agriculture Circ. 520 (Supt. of Documents, Washington, D. C., 10 cents a copy), 23 pp., 6 pls., 10 figs., March (April) 1939.

An illustrated revision of Biological Survey Wildlife Research and Management Leaflet BS-17 which was prepared primarily for educational use in CCC camps; the printed form may be useful also in schools. It discusses zones of salt-marsh plants, and several of the species of plants in relation to wildlife. The birds observable in salt marshes are treated at some length as to characteristics and habits, and other vertebrates more briefly. The introduction is chiefly a brief essay on conservation.

Predation: Hawks vs. quail

Beadel, H. L. Hawks vs. quail on quail preserves, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 42-45.

Experience of a lifelong hunter and preserve owner for a score of years with hawks in relation to quail. Kills by hawks are by no means so common as ordinarily assumed and these birds often get cripples that are best eliminated anyway. Moreover, the hawks feed on rodent and serpent enemies of quail. Blue darters or accipitrine hawks are an exception but as the average

man cannot distinguish them, he had better leave all hawks alone. Plenty of escape coverts can easily be provided and they furnish practical protection against even blue darters. The author sums up: "My experience indicates that an above-average quail population cannot only be maintained, but is more easily maintained by leaving hawks unmolested than by killing them."

Predation: Relative quantities of food consumed

Wooster, L. D. An attempt at an ecological avaluation of predators on a mixed prairie area in western Kansas, Kansas Acad. Sci. Trans. (Topeka) 41, 1938, pp. 387-394, 2 figs., 2 tables.

Discussion of the role of predators on the basis of food requirements per individual, number of individuals per square mile, and time present. Average daily numbers of coyotes and birds of prey are estimated by different methods that are explained. Amounts of food consumed are calculated from those given at two leading zoological gardens. A formula applied to the data is F x T x N = RI in which "F is food per day in grams; T is time--fraction of a year; N is numbers per square mile; RI is relative importance." The figures arrived at are for, the coyote 381, marsh hawk 611, Swainson's hawk 226; rough-legged hawks 22; and other hawks and owls, together, 27. These figures express relative quantities (in grams) of food daily consumed per square mile on the area concerned. Annual figures are for marsh hawks 221,555; coyote 139,065; and Swainson's hawk 82,490. "The annual food importance of the marsh hawk, expressed in avoirdupois weight is 494 pounds, or almost one fourth ton. In terms of meadow mice the marsh hawks on one square mile would require sixteen mice per day, or 5,840 per year. The coyotes on one square mile (one half an animal), if they ate nothing but jackrabbits, would require 45 per year. To supply the annual needs of all dominant predators on one square mile of mixed-prairie would require, for example, 150 jackrabbits, or 12,000 meadow mice, or 50,000 harvest mice." No data are given on the productiveness of prey species on the area--information that is necessary, however, to complete valuation of the predators.

Propagation: Aix

Parsonson, W. J. Foreign and domestic waterfowl in captivity, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 8(12), Dec. 1938. p. 10.

Care of mandarin and wood ducks; nest boxes, food, cover, sanitation.

Propagation: Goose, Canada

Kiehlbauch, Wm. Geese easy to raise, South Dakota Conservation Digest (Dept. of Game and Fish, Pierre, S. Dak.), 5(11), Nov. 1938, pp. 6-8.

Account of rearing the birds on "three city lots." In preparation for the breeding season, oats both whole and sprouted with a little corn are fed. First clutches of 6-8 are removed and in about ten days the females again start laying and produce 5-6 more eggs. The young are fed some oatmeal but

they and the adults as well subsist largely upon grass. Contrary to the usual experience, this breeder found that some geese losing mates will pair again in a short time.

Propagation: Irradiation results

Bissonnette, Thomas H., and Albert G. Csech. A third year of modified breeding behavior with raccoons, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.50 a copy), 20(2), April 1939, pp. 156-162, 7 tables.

Progress report on work that has previously been noticed in WILDLIFE REVIEW, Nos. 10, October 1937, p. 22, and 16, November 1938, pp. 33-34.

Propagation: Irradiation results, pheasants

Bissonnette, T. H., and A. G. Csech. Pheasants activated by night-lighting return to normal nesting, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 26-30, 2 tables.

Authors' abstract: "Black-neck (3 hens), ring-neck (2 hens), and Mongolian (5 hens) pheasants, with cocks, were night-lighted, Jan. 6-April 3, in small pens without cover, then released into large pens, abundant cover, and normal days like those of controls (4 hens and a cock) of each variety. Experimentals began to lay Feb. 24, 21, 28, respectively, and averaged 0.377, 0.322, and 0.573 eggs per hen per day for first 15 days. Controls laid from April 7, 6, and 3, respectively, 0.483, 0.566, and 0.816 eggs per hen per day for their first 15 days. Hatchability of both controls and experimentals was high as judged by samples set under hens.

"After release, ring-necks laid only two eggs loose in the pen and built no nests; black-necks laid some scattered eggs, built a nest, and set on 12 eggs laid therein; Mongolians did likewise, setting on clutches of 12 and 13 eggs. Reset under hens, these clutches yielded 91% fertility and 83% hatch for black-necks and 87% and 79%, respectively, for Mongolians. These last two varieties can be used to get numerous early fertile eggs and still be planted later in suitable regions with good prospects of producing broods in the immediately following normal breeding season. Ring-necks seem to be less adaptable for such double use."

Propagation: Mortality in gallinaceous embryos

Asmundson, V. S. The position of turkey, chicken, pheasant, and partridge embryos that failed to hatch, Poultry Science (Dr. G. F. Houser, Cornell University, Ithaca, N. Y., 75 cents a copy), 17(6), Nov. 1938, pp. 478-489, 6 tables.

Results in the case of ringneck, Mongolian, and Reeves pheasants, and chukar partridges were similar to those in poultry--turkeys and chickens. From the author's summary: "Embryos with head to the left or head between the thighs, whether in the large or the small end, rarely pipped the shell and

presumably very seldom hatch. A relatively high percentage of the embryos with head to the right pipped the shell and presumably may hatch regardless of whether they have the head in the large or small end or whether the beak is over or under the wing or towards or away from the air cell. Relatively more turkey embryos have the head in the small end of the egg when the eggs are incubated horizontally than when they are incubated with the large end up for the first 24 days. Such embryos, even when the head is turned to the right, are apparently handicapped by their position and, therefore, are less likely to hatch than those with the head in the large end. The difference in the incidence of embryos with head to the left from different strains and hens indicates that hereditary factors are involved." Bibliography of 18 titles.

Propagation: Partridge, Hungarian

Hunt, Roy M. Experiments with Hungarian partridge, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(7), March 1939, pp. 4-5, 1 photo.

Four types of breeding pens tested; report on one season's experience; an elevated pen with half-inch mesh hardware cloth seems best. Details of construction and of the results with the birds kept in the different types are given.

Propagation: Pheasants

Silta, Henry. Do's and don'ts on pheasant raising, Game Breeder and Sportsman (205 E. 42nd St., New York, N. Y., 25 cents a copy), 43(2), Feb. 1939, pp. 21, 23.

Principal advice is to treat all species, common or rare, the same, and the best possible. A table gives the date of first egg laid and period of incubation at Great Barrington, Mass., of 39 kinds of pheasants.

Propagation: Quail

Abegg, Roland. Quail hatcheries, Louisiana Conservation Review (Dept. of Conservation, New Orleans, La.), 7(3), Autumn 1938, pp. 19-22, 25, 3 photos.

Methods employed at a farm established at the State University for both practical and experimental purposes. Management of breeders, pairing and egg production, incubation, brooding, and miscellaneous techniques are discussed. Among the latest named is control of picking by the use of red lighting. There is general conservation discussion also and a plea for discrimination among hawks.

Propagation: Raccoon

Millard, Clarence. Raccoon experiment, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(3), March 1939, pp. 28-29, 1 photo.

Success in breeding females twice in a season; in November they appeared to be in just as good condition as those that had borne only one litter.

Propagation: Teals

Parsonson, W. J. The North American teal, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 9(3), March 1939, p. 11.

Notes on colors, number of eggs, and incubation period, besides hints on feeding and rearing.

Propagation: Vices

Bass, C. C. A practical remedy for the "nose-picking" form of cannibalism in young quail in close confinement, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 9(5), May 1939, p. 4.

Mentions trimming bills, liberal pen room on grass, and balanced rations but from his own experience, recommends feeding chicks all the raw meat they will eat.

Propagation: Widgeons

Parsonson, W. J. The widgeon family, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., Doylestown, Pa., 25 cents a copy), 9(1), Jan. 1939, p. 10.

Descriptive notes on 3 species, and suggestions as to their care, especially feeding.

Propagation: Wild turkey

Beyers, Lillian E. Rearing wild turkeys in the wild, Game Breeder and Sportsman (205 E. 42nd St., New York, N. Y., 25 cents a copy), 43(1), Jan. 1939, pp. 2-3, 14, 2 photos.

General notes on the wild turkey and its habits with description of 5 years' experience in propagating these birds. The hens were allowed to select their nest sites and rear their broods undisturbed, control being exercised later and only as to their roosting quarters.

Research: Banding woodcock

Mendall, Howard L. A technique for banding woodcock, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass., 75 cents a copy), 9(3), July 1938, pp. 153-155.

Discussion of 4 methods of which the best was use of a well-trained dog to locate young after they had left the nest, the dog being tied upon making a point.

Research: Bob-white's resistance to cold

Gerstell, Richard. Certain mechanics of winter quail losses revealed by laboratory experimentation, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, Pa., 10 cents a copy), 9(2), May 1939, pp. 4-5, 28, 1 fig., 1 table.

References to literature on winter losses, description of the huddling habit, and of the experiments. The table shows average body temperatures of 80 quail taken in the gizzard and at three exterior points. The author's conclusions are: "(1) That the characteristic huddling habit of the bobwhite quail may at least in part represent an instinctive reaction which tends to reduce the heat loss from the bodies of the various individuals which make up any given covey; (2) that, at least within certain limits, the ability of a covey of quail to withstand low environmental temperatures is directly proportional to the size of that covey; (3) that the body temperature of individual quail may drop more than twenty-five degrees (Fahrenheit) below normal without the bird's suffering a breakdown of its thermal regulatory system which would result in death." He also says: "In closing, it seems fitting to call to the game manager's and sportsmen's attention the practical importance of the results obtained even from the few experiments so far completed. This lies in the indication that throughout the northern portion of the quail range, the bobwhite coveys should not be shot down to a point where their chances of winter survival are seriously endangered simply by too great a reduction in the average size of the bevies." Bibliography of 6 titles.

Research: Climatometer

Gerstell, Richard. The climoctometer. A device designed to measure the effects of various meteorological factors upon the activity and general physiology of animals, Pennsylvania Game Commission (Harrisburg, Pa.) Research Circ. 1, 20 pp., 8 figs., 1938.

The device described consists of an insulated chamber in which animals can be exposed to temperature, air movement, and precipitation as desired, of activity relays for measuring responses, and of an "actometer" for recording them. Illustrations include plans and photographs. Bibliography of 10 titles. [Composition of the name appears faulty. The principle of elision would seem to bar the use of two vowels together in the middle of the word. The alteration suggested in the caption of this abstract implies all but the recording feature of the machine, which it would seem can be taken for granted, as many measuring devices include self-recorders.]

Research: Essential basis of management

Taylor, Walter P. Value of wildlife research for proper land-use management, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 27(4), July-August 1938, pp. 72-73, 77, 3 photos.

Wildlife management is a part of land use and a matter of national concern. Wildlife also is greatly worth caring for from a financial viewpoint. A number of questions are asked relative to practical wildlife management that can be answered satisfactorily only from fuller knowledge than is at present

available. The necessity of research as the basis for a sound conservation program is evident. In the present immediate great need of usable facts, research should be specifically directed toward desired objectives.

Research: Respirometer

Boettiger, Edward G. A simple respirometer for small animals, Nature (Macmillan and Co., Ltd., St. Martin's St., London, W.C. 2, England, 1 shilling a copy), 142(3586), July 23, 1938, pp. 151-152, 1 photo.

Description and illustration of a constant-pressure type of respirometer developed at Harvard University, which permits direct reading of oxygen consumption.

Research: Tagging elk

Cramer, Albert J. Ear-tagging elk, Field Notes on Wildlife (U. S. Forest Service, Northern Rocky Mountain Region, Missoula, Mont.), 1(2), Feb. 1939, 5 pp., multilithed.

Report on 2 years' work on a small scale. The tagging was done with least disturbance to the elk by men using saddle horses. From 4-6 calves can be found and tagged daily by each man. It is best to work the same area only one day at a time and not more than 3 times all together. Notes are given on two adults found dead from natural causes and on 3 calves killed by coyotes. Returns from 4 tagged animals are cited, not enough to warrant conclusions. Continuance of the work is recommended.

Weights: Birds

Baldwin, S. Prentiss, and S. Charles Kendeigh. Variations in the weight of birds, Auk (Rudyard Boulton, Field Museum, Chicago, Ill., $1.00 a copy), 55(3), July 1938, pp. 416-467, 6 figs., 7 tables.

References in the bibliography of 51 titles are a good source of information on average and extreme weights of birds; this paper is an analysis of the variations in the weight of individuals of various species under different circumstances. A great deal of data is presented and discussed. Among conclusions are that "differences occur between the weights of different individual birds but such differences are scarcely greater than may occur in the weight of a single individual at different times." There are daily and yearly rhythms in the weight of the birds studied as well as variations correlated with temperature.

WILDLIFE RESEARCH AND MANAGEMENT LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of Agriculture, Washington, D. C.

BS-122. Big-game inventory of the United States, 1937, 13 pp., 17 tables, January 1939.

Compilation of information from a variety of sources of which the Federal land-administrative agencies were most productive. Data given for 15 kinds of animals in the wild or in no more than semi-confinement, e.g., the bison. Comparisons made when previous figures were available indicate increases for deer, elk, antelope, and black bear. The data are tabulated by States.

BS-123. Crow damage to fall grain crops in Oklahoma in 1937, by Ralph H. Imler and E. R. Kalmbach, 15 pp., 1 fig. (map), 3 tables, January 1939.

Based on studies made at intervals since 1920, report is made on the distribution and abundance of crows and on damage done especially to grain. Responses to a questionary on these points from more than 1,100 farmers are summarized and the results compared with those of field observations. Annual loss in the county most thoroughly studied exceeded $18,000. Further investigation is advised.

BS-124. Factors in nesting losses of the California valley quail, by E. E. Horn, 7 pp., January 1939.

California ground squirrels are the most serious check upon quail breeding; other inimical factors, and management are discussed. Bibliography of 7 titles. Reworking of the article with similar title abstracted in WILDLIFE REVIEW, No. 17, December 1938, pp. 34-35.

BS-125. Natural plantings for attracting waterfowl to marsh and other areas, 5 pp., January 1939.

Plants are recommended for improving: (1) areas characterized by muddy, fluctuating water (as in the Mississippi Valley); and (2) coastal marshes and marshland ponds. Correspondence is invited both as to these and other areas.

BS-126. History and significance of American wildlife: II, by H. P. Sheldon, 7 pp., February 1939.

A statement for educational use, commenting on the rapid exploitation of American natural resources, present day recognition of the need of conservation, planning wildlife restoration in the light of research, progress made in that direction and also in protective legislation, and restoration as a government function.

BS-127. An efficient trap for the fox ranch, by Charles F. Bassett, 2 pp., 3 pls., March 1939.

Trapping alive without injury is possible with a recently devised trap that is described and illustrated.

BS-128. A feeder for foxes, by Charles F. Bassett, 2 pp., 1 pl., March 1939.

Description, plans, and specifications of the feeder found most satisfactory at the U. S. Fur Animal Experiment Station, with notes on its use and care.

BS-129. Cooperative wildlife-management research, 1938, 4 pp., 3 tables, March 1939.

Locations, leaders, demonstration areas, subject of study, and students concerned in 11 projects. The units have contributed to the protection and management of wildlife, and to the training of men for conservation work.

BS-130. Seasonal fox rations and quantities to feed, by Charles F. Bassett, 3 pp., 2 tables, April 1939.

Permissible variations in rations, with especial reference to the raw-meat content, with suggestions as to kinds, quantities, and seasons for feeding; notes also on dietary requirements of males, females, and weaned pups.

BS-131. Suggestions on attracting birds, with references to available literature, 5 pp., 1 fig. (map), April 1939.

Brief suggestions with references to available official and current non-official literature (12 titles of each) on protection, nesting facilities, and water supply and food supplies.

BS-132. Some California wildlife-forest relationships, by E. E. Horn, 5 pp., April 1939.

Effects of forest-wildlife interactions; type of forest affects wildlife and vice versa; results of California studies. About the same material as abstracted under a similar title in WILDLIFE REVIEW, No. 17, December 1938, pp. 10-11.

BS-133. A preliminary investigation of the food habits of the mourning dove in Alabama, by Walter Rosene, Jr., 10 pp., 2 tables, April (May) 1939.

Analyses of 287 stomach contents presented in tables and text. More than 99 percent of the food was seeds of which those of grasses, especially cultivated grains, were most important (55 percent). Other leading sources of food were: Pokeweed, chickweed, legumes, doveweeds, evening primrose, and ragweeds. Animal food was insignificant.

BS-134. A summary of the gray squirrel investigation in southeastern Ohio, by Floyd B. Chapman, 9 pp., 4 tables, April (May) 1939.

Results cited as to weights, sex ratios, age-class groups, dens and leaf nests, mating period and litters, and parasites and diseases. There are also reports on population studies and an analysis of squirrel hunting; recommendations as to management; and bibliography of 12 titles. Much the same material as previously abstracted in WILDLIFE REVIEW, No. 17, December 1938, p. 19.

SPECIAL ARTICLE

Sources of material abstracted in WILDLIFE REVIEW (Numbers 1-21)

Only a summary is here presented but details can be supplied later if there appears to be sufficient demand.

Books and other independent publications accounted for 34 abstracts.

Sources of others are given in the following tabulation.

USONIAN PUBLICATIONS

Federal

	Number of Abstracts
Department of Agriculture	
Departmental Series	62
Biological Survey	97
Forest Service	60
Soil Conservation Service	25
All others	7
Other Departments and Agencies	22
Congress	13

Federal-State Cooperatives

Minnesota	30
Ohio	17

State Conservation Departments

California	28
Maryland	13
Michigan	28
Minnesota	20
North Carolina	16
Ohio	19
Pennsylvania	73
Wisconsin	24
All others	34

Other State Departments and Agencies

All together	10

Agricultural Colleges and Experiment Stations

Cornell	5
Michigan	7
All others	24

Other College and University Publications

Cornell	6
Idaho	20
Iowa	6
All others	18

Publications directed to, or supported by, Sportsmen

American Wildlife Institute	
American Wildlife	39
Special Publications	5
Transactions North American Game Conferences	284
Game Breeder and Sportsman	34
Modern Game Breeding and Hunting Club News	31
All others	71

Academies of Science

All	15

Agricultural Journals

All	55

Bird Magazines

Bird-Banding	15
Condor	13
Wilson Bulletin	27
All others	29

Botanical Journals

All	9

Conservation Periodicals

Journal of Wildlife Management	57
All others	30

Entomological Journals

All	6

Forestry Journals

Journal of Forestry	45
All others	20

Miscellaneous Periodicals, mostly Scientific

Ecology	22
Journal of Mammalogy	74
Journal of Parasitology	36
Proceedings of the New Jersey Mosquito Extermination Association	23
All others	87

FOREIGN PUBLICATIONS

Canada

Canadian Field-Naturalist	14
All others	30

Remainder of British Empire

Imperial Chemical Industries Advisory Leaflets	19
Journal of Animal Ecology	14
All others	29

Other Countries

All	7

NOTES AND NEWS

Biological Survey: Federal Aid to the States.--In March it was reported that 47 States had indicated that they wish to participate in the new Federal-State cooperative plan for wildlife restoration and that of 67 projects submitted by 31 States, 32 had been approved and funds set aside in the U. S. Treasury for the work.

Biological Survey: Refuges.--The Kofa and Cabeza Prieta game ranges in Arizona, recently established by Executive Order, have added more than a million and a half acres to the Federal areas devoted to wildlife conservation. Set apart primarily as refuges for mountain sheep, or bighorns, the two ranges will also afford protection and security to other species of wildlife, among them, the antelope, peccary, mule deer, and Gambel's quail. The proximity of the Cabeza Prieta Game Range to the Mexican border lends an unusual international interest. Already negotiations are pending with the Mexican government for the establishment of a similar game range adjoining and south of the border.

Biological Survey: Writing.--A 3-page mimeographed leaflet entitled "Those Sporting Plurals" has been issued. It treats the pluralization of animal names, especially those often used in sporting parlance in the same form, singular and plural. Copies may be had upon application to Technical Adviser, U. S. Biological Survey, Washington, D. C.

In Delaware Game and Fish News (1(3), December 1938, p. 3) is the interesting statement that the restocking investment of the State Game and Fish Commission for the last three years amounted to 12 cents per acre or about $7.60 per square mile for the entire State.

The large toad, Bufo marinus, has been introduced from Porto Rico into Florida to aid in the control of cutworms and other insects. (Ann. Rep. Fla. Agr. Expt. Sta., 1937, p. 142).

Numerous papers presented at the first and second Idaho Game Management Conferences, 1937 and 1938, have been printed in the University of Idaho (Moscow) Bulletin (Vol. 33, No. 22, December 1938, 98 pp.). Thirty-two articles are printed, of which 21 are abstracted in the last three issues of WILDLIFE REVIEW. Five papers presented but not printed and 6 informal talks also are listed as part of the proceedings. The bulletin was edited by A. B. Hatch who also supplied a foreword.

The Annual Report of the Ohio Wildlife Research Station for 1937-38 has appeared in mimeographed form (Release 89, Ohio Wildlife Research Station, Columbus, 10 pp., n.d.). The objectives, location, staff, and student personnel are listed, the status of 16 projects tabulated, the uses to which results of the research program have already been put are recorded, and educational activities, publications, manuscript reports, maps, and research forms and outlines, summarized.

From the South Dakota Conservation Digest for November 1938, we learn that pheasants were first introduced in that State in 1912. The twentieth consecutive open season was in 1938 and during those two decades, "a conservative estimate discloses that some 17,500,000 of these birds have been legally taken by hunters. This makes a total of more than 25 million pounds of dressed meat, equivalent to 25,000 two-year-old fattened beeves 'on the hoof', or ten train loads of 100 cars each."

"Smaller Homes.--With the lion's share of a continent at our disposal, we Americans are rather given to thinking of wildlife conservation in very large and spacious terms. The idea that anything worth while can be done in less than a thousand square miles seems hardly worth considering.

"Yet two of Europe's smaller countries, Denmark and the Netherlands, have well-worked-out systems for the protection and encouragement of wildlife, despite the intensive utilization of the last inch of cultivable land necessitated by their limited territories and dense populations.

"In Denmark, the government may create wildlife preserves, upon suitable compensation to the landowners. But landowners themselves may set up preserves if they so desire, with the scientific advice and assistance of the government. Two types of wildlife preserves are provided for, intended respectively for game-providing and scientific purposes.

"In the Netherlands the cause of wildlife conservation is a genuinely popular one. There is a well-organized society for nature protection, with a membership of 13,000, who are backed by other and even larger organizations such as the bicyclists' union, with over 100,000 members. These groups have been so well able to swing public opinion--not to mention fiscal legislation--that in the past 31 years no less than 39 game and wildlife sanctuaries have been established.

"As in Denmark, private landowners are encouraged to put some of their lands to use for the benefit of wildlife. In the Netherlands, this encouragement takes the practical and highly tempting form of a partial remission of taxation. As a result, more than 325 large estates, with a total of over 125,000 acres, have taken advantage of this law--and given the country the advantage of their utilization as homes for game and wildfowl." (Science News Letter, 36(7), February 18, 1939, p. 110.)

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WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
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Washington, D. C. No. 22 August, 1939

Biological Survey: Cooperative wildlife research

Couch, Leo K. Review of cooperative wildlife management research, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 28(4), July-August 1939, pp. 172-177.

Brief statement as to origin, history, and set-up of 11 units (10 active) and notes on their chief findings as to inventories, natural propagation, environmental improvement, and limiting factors on game populations. The work reported on included also demonstration and other educational activities. The titles of several theses by graduate students are given in illustration of the diversity of the investigational work.

Biological Survey: Federal aid act

Day, Albert M. The wildlife restoration program under the Pittman-Robertson Act of 1937, U. S. Dept. Agriculture Miscellaneous Publication 350 (Supt. of Documents, Washington, D. C. 5 cents a copy), 11 pp., May 1939.

Restoration of wildlife by cooperative Nation-State action: how States may qualify to participate; source of revenue; apportionment and method of allocating available funds, types of suitable projects and their maintenance; projects not contemplated by the Act; personnel; text of the law and regulations.

Biological Survey: Refuge program

Anon. Planning for a permanent agriculture, U. S. Dept. Agriculture Miscellaneous Publication 351 (Supt. of Documents, Washington, D. C. 15 cents a copy), 71 pp., June 1939.

The section on refuges (pp. 64-68) discusses the need of wildlife for land and the steps that are being taken to satisfy this requirement for waterfowl, colonial birds, and big game. Present total acreage in refuges is about 11,500,000 acres; waterfowl have some 7,500,000 and need some 3,000,000 more. Relation to this program of the Federal Aid to Wildlife Restoration Act.

Conservation: Bear, Brown

Heintzleman, B. Frank. [Alaska brown bear conservation], Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(6), June 1939, pp. 510-511.

The kill on Admiralty Island has not exceeded 35 in any year since the existing conservation plan was put into effect (1932) and the animals have materially increased in number. Counts have revealed one brown bear to 2.23 square miles on Chicagof Island and one to 1.85 square miles on Admiralty Island; these seem quite dense for such a large wilderness animal. Bear conservation is now thought to be satisfacory throughout Alaska.

Conservation: Bird enemies of grasshoppers

Barker, Elliott S. Grasshopper plagues and bird conservation, New Mexico (208 W. Gold Ave., Albuquerque, N. Mex. 15 cents a copy), 17(6), June 1939, p. 31.

References to plagues in other days and lands and to the universal recognition of birds as enemies of grasshoppers. They constantly check the insects on their breeding grounds while human control of the migrating hordes is costly and of only temporary effectiveness. Encouragement is urged of natural enemies, especially hawks and curlews, by conservation of the birds and their habitats.

Conservation: Desert bighorn

Dixon, Joseph S., and E. Lowell Sumner, Jr. A survey of desert bighorn in Death Valley National Monument, summer 1938, California Fish and Game (Ferry Bldg., San Francisco, Calif.), 25(2), April 1939, pp. 72-95, figs. 26-43.

From 1880, mining developments encroaching upon water supplies and mine employes shooting the animals caused serious decrease in the numbers of desert bighorns. Since the establishment of Death Valley National Monument the animals have the range to themselves, poaching has been gradually eliminated, and a degree of restoration (10-25 percent) has been achieved. The present investigation centered mainly about water holes, the location of 21 of which is shown on a map.

Conservation: Eagles

Lumley, Ellsworth D. The two eagles of North America, Emergency Conservation Committee (734 Lexington Ave., New York, N. Y.), 19 pp., illus., June 1939.

Edited by Herbert Friedmann and with an introduction by Francis H. Herrick this leaflet has the best of sponsors. It describes persecution of eagles, discusses the fabulous character of some of the most serious accusations against the birds, gives the principal facts in the life histories of both the golden and bald eagles and makes a plea for their preservation. Eagles are protected by law in 5 States and by provision in 21, but are still subject to a bounty in Alaska. The publication is designed for school use and includes a list of questions based upon the text and a suggested eagle program for a high school assembly. Bibliography of 19 titles.

Conservation: Guide

Anon. Conservation guide, Garden Club of America (958 Madison Ave., New York, N. Y.), 46 pp., 1939.

A guide to source material for education, planning, and preservation, including many references to books and other publications. Suggested headings for a conservation file or library.

Conservation: Hawks

Wickstrum, R. K. Hawks, Arizona Wildlife and Sportsman (125 North Second Ave., Phoenix, Ariz. 15 cents a copy), 1(5), May 1939, pp. 5-7, 2 charts.

Diversity of hawks, limited number of preponderantly injurious species, protection of hawks by the States, brief notes on food, and reproductions of charts on identification and food habits of western hawks prepared by the National Association of Audubon Societies.

Control: Fish predators

Lagler, Karl F. The control of fish predators at hatcheries and rearing stations, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(3), July 1939, pp. 169-179, 1 table.

Author's abstract: "In 1937, 15,223 reptiles, birds, and mammals were killed at 228 fish hatcheries in 38 States according to figures based on return from a nation-wide poll. Of the several control methods reported, screening and wiring of ponds and raceways and shooting and trapping of predators afforded the greatest protection. Wider use of controls that do not involve the wholesale destruction of actual or supposed predators is recommended."

Control: Policy in national parks

Cahalane, Victor H. The evolution of predator control policy in the national parks, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 229-237.

Author's abstract: "Since establishment of the first national park in 1872, policy as to protection or destruction of predators has fluctuated with official and public changes of opinion. With few exceptions until about 1925, control was pursued as vigorously as financial means permitted. Methods included trapping, hunting with dogs, poisoning and shooting, the latter being used most extensively after 1920 due to its greater selectivity. As thought advanced, the list of proscribed species became smaller and was finally restricted to the cougar, wolf, and coyote. All control finally ceased in 1935. Predators are and will be protected in the same measure as other park animals."

Control: Of Predators overdone

Pough, Richard. Are we over-controlling predators?, Hunting and Fishing (275 Newbury St., Boston, Mass. 5 cents a copy), 16(6), June 1939, pp. 15, 37, 1 photo.

Control to protect livestock may be justified but extension of the work solely for the alleged benefit of game is bringing protests from men who know wildlife problems. The function of predators as a sanitative force in relatio

to wild animal species and associations is emphasized. The number and difficulty of the activities involved prevent man from successfully substituting his own exertions for those of the predators. If there are not enough predators left on a given area to perform their important natural functions, then control has there been overdone.

Cycles: Hare, Snowshoe

Clitty, Dennis, and Charles Elton. The snowshoe rabbit enquiry 1937-38, Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 25 cents a copy), 53(5), May 1939, pp. 63-70, 6 maps, 2 tables.

This progress report based on 585 responses from Canada and 55 from the United States tells of patchy recovery in the former country most marked in the southwest, and of recovery begun in the latter country especially in the east. In some parts of Alaska decline had set in while abundance continued in others.

Cycles: Microtus

Whelan, R. V. Vole plague at Smoky Falls, Ontario, Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 25 cents a copy), 53(4), April 1939, pp. 53-55.

Rise, climax, and decline occurred in a period of 2 years--1936-38. Numbers were great and attracted predators in unusual abundance. Damage to lawns, fruit, ornamental, and other trees and shrubs is described. Tick infestation was high. The sex ratio tended strongly toward males, especially near the end of the peak period.

Destruction: Extinct and vanishing birds

Gowanloch, James N. Vanished Americans, Louisiana Conservation Review (Dept. of Conservation, New Orleans, La.), 7(1), Spring 1939, pp. 39-45, 49, 5 figs.

History and causes of extinction of the great auk, Labrador duck, Eskimo curlew, passenger pigeon, short-tailed albatross, heath hen, masked bobwhite (in the United States), and Carolina parakeet. Three species so reduced in numbers that their survival is problematical are the trumpeter swan, whooping crane, and ivory-billed woodpecker.

Destruction: Highway

Dickerson, L. M. The problem of wildlife destruction by automobile traffic, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(2), April 1939, pp. 104-116, 4 figs., 3 tables.

Author's abstract: "It is suggested that an experimental approach be made to the problem of reducing the frequency of fatalities to wildlife resulting from automobile traffic. The data used include observations on roadside cover conditions associated with the presence of victims observed over a period of more than three years and more than 12,000 miles of travel. A statistical comparison is made between data collected by the writer and similar information previously published. The frequency of dead animals is shown to be much greater on highways through plains country where only grass or low herbaceous cover is found than in other parts of the country where woody cover is more common." Bibliography of 10 titles.

Destruction: Winter killing

Trautman, Milton B., William E. Bills, and Edward L. Wickliff. Winter losses from starvation and exposure of waterfowl and upland game birds in Ohio and other northern States, Wilson Bulletin (University of Michigan, Ann Arbor. 60 cents a copy), 51(2), June 1939, pp. 86-104, 8 figs., 2 tables.

Unusually large numbers (tabulated) of waterfowl partly attracted by lavish baiting were on Ohio marshes and lakes during the winter of 1931-32 and a great many of them perished. Details are given as to loss of weight compared to "normal" and cross-sections of breasts illustrated. Winter killing of bob-white, ringneck pheasants, and ruffed grouse also in Ohio and other States is discussed. Bibliography of 28 titles.

Authors' conclusions: "Winter mortality of waterfowl and some species of upland game birds, caused by starvation, exposure to low temperatures, or a combination of both, occurs in widely scattered localities in the northern United States. Such mortality generally takes place during or immediately following severe sleet or snow storms when low temperatures freeze the surface water shutting off the usual food supply. During the average stress period apparently only those birds die which are weakened by disease, parasitism, lead poisoning, mechanical injury such as are made by gunshot wounds, or ice formation over eyes, in bill and nostrils. In extreme stress periods, and especially when the accumulated, adverse effects of winter are most pronounced, mortality of normal birds may occur from starvation and exposure."

Diseases and Parasites: Anthrax in mink

Howarth, C. R., and L. Seghetti. Anthrax in farm-raised mink in Oregon, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 40 cents a copy), N.S. 74(4), Part II, April 1939, pp. 433, 434.

General notes on anthrax; history of the case reported, pathological and bacteriological findings. "A Gram-positive bacillus, morphologically and culturally identical with Bacillus anthracis, was isolated from mink. Transmission experiments in guinea pigs and a sheep produced symptoms and lesions typical of anthrax infection."

Diseases and Parasites: Arthritis

Fox, Herbert. Chronic arthritis in wild mammals, Trans. Amer. Philosophical Society (Philadelphia, Pa.), N.S., 31(2), Feb. 1939, pp. 73-148, 12 pls., 2 charts, 1 table.

Chronic arthritis similar to that affecting man occurs in other mammals even in the wild. Results from examination of more than 1,700 skeletons are discussed and illustrated. The disease occurs chiefly in larger animals and may possibly be related to locomotion and the associated jolt shock.

Diseases and Parasites: Avian malaria

Hegner, Robert, and Fruma Wolfson. Association of Plasmodium and Toxoplasma-like parasites in birds, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $2.50 a copy), 28(3), November 1938, pp. 437-454, 11 figs., 1 table.

Experiments with canaries on strains derived from various wild birds. From authors' abstract: "Observations are presented that favor or oppose the hypothesis that birds containing both Plasmodium and Toxoplasma-like parasites are suffering from a mixed infection with two different types of organisms. Our conclusion is that this is a possibility and that schizogony in reticulo-endothelial cells as part of the life cycle of avian Plasmodium is still to be proved." Bibliography of 20 titles.

Diseases and Parasites: Botulism in silver fox

Pyle, Norman J., and Richard M. Brown. Botulism in foxes, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 40 cents a copy), N.S. 74(4), Part II, April 1939, pp. 436-439.

Heavy mortality among silver foxes on a ranch in the East was traced to botulism caused by spoiled canned fish. Lesions are described and bacteriological and experimental investigations reported upon.

Diseases and Parasites: Botulism, resistance of vultures to

Kalnbach, E. R. American vultures and the toxin of Clostridium botulinum, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 40 cents a copy), N.S. 47(3), March 1939, pp. 187-191, 2 tables.

The turkey vulture is highly resistant to both oral and injected doses of the toxin of this bacterium (Type C) and to injections also of Types A and B. The blood sera of both the turkey and black vultures have antitoxic effects, experimental evidence of which is reported. Bibliography of 6 titles.

Diseases and Parasites: Capillaria columbae

Wehr, Everett E. Studies on the development of the pigeon capillarid Capillaria columbae, U. S. Dept. Agriculture Tech. Bul. 679 (Supt. of Documents, Washington, D. C. - 5 cents a copy), 19 pp., 3 figs., 6 tables, May 1939.

Description, illustration, life history, pathology, and control of this nematode which infests not only the common pigeon but also other birds including the mourning dove and turkey.

Diseases and Parasites: Cysticercus

Whitlock, S. C. Infection of cottontail rabbits by Cysticercus pisiformis (Taenia pisiformis), Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 258-260.

Author's abstract: "Infection of Michigan cottontail rabbits by cysticerci of the dog tapeworm, Taenia pisiformis, is a common finding. Many safely edible rabbit carcasses are discarded each year by hunters because of the presence of these parasites. Fear of contracting disease and objection to eating game appearing to be abnormal are the principal factors involved. The pathological effect of these parasites on the rabbits in general appears to be slight though occasional massive infections may damage individual animals."

Diseases and Parasites: Deer, Wisconsin

Minor, Fred T., John Hanson, and A. M. McDermid. Report of two deer yards in Douglas and Bayfield Counties, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(5), May 1939, pp. 18-24, 1 photo, 1 table.

Description of yards that are so overbrowsed that when the deer are confined to them by deep snow the smaller animals especially, not being able to reach as high as the others, die of starvation and associated maladies. Tabulation and notes on pathology of 26 deer found dead. The diagnoses are of pneumonia 13, bots 18, and starvation 9. Aside from the starvation, perhaps, none of the conditions found would cause serious loss in a deer herd.

Diseases and Parasites: Distemper

Green, R.G., and C. A. Evans. A comparative study of distemper inclusions, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 a section), 29(2), March 1939, pp. 73-87, 4 figs., 3 tables.

Review of study of canine distemper and the characteristic inclusion bodies and of parallel work on fox encephalitis. Notes are given also on the pathology of distemper in minks and ferrets. Authors' conclusions: "(1) Canine distemper and epizootic fox encephalitis can be differentiated with certainty by their respective inclusion bodies, (2) the virus of canine distemper produces

morphologically identical inclusion bodies in dogs, foxes, minks, and ferrets. There are minor differences in the distribution of inclusions in the several species." Bibliography of 19 titles.

Diseases and Parasites: Distemper

Ott, George L., Jr. Treatment of fox distemper, Journ.American Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 40 cents a copy), N.S. 47(5), May 1939, pp. 522-525, 1 photo, 4 charts.

Description of conditions on a modern fox farm in Wisconsin and of outbreaks of distemper causing mortality of 35-60 percent of the pups. Treatment with homologous anti-canine distemper serum as a prophylactic agent reduced mortality 50 to 66 percent and is considered economically sound.

Diseases and Parasites: Echinococcus

Riley, W. A. The need for data relative to the occurrence of hydatids and of Echinococcus granulosus in wildlife, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 255-257

Author's abstract: "Despite known occurrence of E. granulosus in domestic animals in the United States and recent evidence that it occurs not uncommonly in Minnesota moose, there is only one authenticated record of the finding of the adult stage in dogs in this country. In examinations of timber wolves, Canis lupus lycaon from the area where the infected moose occurred it was found that 5 out of 8 harbored adult E. granulosus. No infested coyotes or foxes were found. Attention is called to the importance of more extensive studies of the problem and to the opportunities which students of wildlife have to make significant contributions."

Diseases and Parasites: Encephalomyelitis

Van Rooksl, H., and Miriam K. Clarke. Equine encephalomyelitis virus (Eastern type) isolated from ring-necked pheasant, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 40 cents a copy), N.S. 47(5), May 1939, pp. 466-468.

Material from pheasants from a New Jersey game farm subjected to various laboratory tests which are described, the conclusion being that the infective agent appears identical with the virus that produces the Eastern type of equine encephalomyelitis. The English sparrow was found to be highly susceptible under experimental conditions. Review of recent literature to which 5 citations are given.

Diseases and Parasites: Gapeworm

Dolgleno, J. P., and H. O. Stuart. Use of iodine for gapeworms in pheasants, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 40 cents a copy), N.S. 47(5), May 1939, p. 538.

A few drops of iodine vermicide (diluted according to the directions for internal medication) placed in the trachea with a pipette relieved the birds; autopsies of 2 indicated that all of the parasites had been killed. The article refers to a paper in which barium antimonyl tartrate is recommended for the removal of gapeworms.

Diseases and parasites: Giardia

Travis, Bernard V. Descriptions of five new species of flagellate protozoa of the genus Giardia, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 25(1), Feb. 1939, pp. 11-17, 1 pl.

From the American bittern, little blue heron, western meadowlark, swamp sparrow, and muskrat. Descriptions, measurements, illustrations, and discussion of relationships.

Diseases and Parasites: Gull, Herring

Harrington, Robert W., Jr. Parasites of the herring gull Larus argentatus smithsonianus, Bowdoin College (Brunswick, Maine) Bul. 6, April 1939, pp. 14-18, charts, mimeographed.

Field notes on the birds, including some on food, and list of parasites including 7 kinds of Trematoda, 6 Cestoda, 1 Nematoda, and 2 Acanthocephala.

Diseases and Parasites: Lead poisoning

[McLean, D.] Shot poisoning of wild ducks, California Conservationist (306 State Office Bldg., Sacramento, Calif. 15 cents a copy), 4(5), May 1939, p. 9.

Report on dead birds seen on various areas and statistics from screening and panning as to the number of shot per acre on 9 different sites (8-56 thousands). [In this report the presence of shot in gizzards seems to be taken as evidence of lead poisoning but on that criterion a very high proportion of wild fowl would have to be adjudged as suffering from the malady. Some evidence from symptoms and lesions should be sought; among the latter, blackening of the lining of the caeca is an indication that lead is being absorbed.]

Diseases and Parasites: Malaria

Stauber, Leslie A. Factors influencing the asexual periodicity of avian malarias, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(2), April 1939, pp. 95-116, 7 figs.

Results of experiments with canaries. Review of literature of which 30 titles are cited. Most of the strains have synchronous rythyms which are multiples of 24 hours dependent upon activities of the host. Author's summary: "(1) A study of the experimental modification of the asexual periodicity of avian malaria was conducted on three strains of P. [Haemoproteum] cathemerium ('C,' 'D' and 'N') and on one strain of P. relictum var. immutatum ('R'). One

of the strains ('N') was obtained by single-parasite isolation; (2) the synchronous periodicity of reproduction of avian malaria is affected by alternate 12-hour periods of high and low temperature; (3) it is affected by light itself--active through the eyes and not through the body surface--if of sufficient intensity to cause the host to be active; (4) as a corollary to (2), it is associated with rest or sleep which seem to be important orienting factors; (5) it is not affected by host feeding of the type devised in these experiments; (6) it is considered possible that the host may furnish a set of critical temperature conditions which orients the time of segmentation. In such an hypothesis, the period of rest becomes important in that it makes possible the temperature differential necessary for the appearance of the critical value."

Diseases and Parasites: Minnesota investigation

Green, R. G., et. al. Minnesota Wildlife Disease Investigation (Dept. of Bacteriology, University of Minnesota, Minneapolis), Dec. 1938, pp. 87-96, table 40, mimeographed.

Hemoproteus in the blood of mallards in winter; lead poisoning may activate chronic infections. Results as to trapping snowshoe hares. Notes on pathology of 5 hares, 1 skunk, and 2 raccoons. List of publications of R. G. Green and associates on diseases of wildlife, Nos. 1-23 on studies conducted prior to, and Nos. 24-88 subsequent to, the arrangement for cooperation between the University of Minnesota, Minnesota Department of Conservation, and the Biological Survey.

Diseases and Parasites: Polymorphus

Van Cleave, Harley J. A new species of the acanthocephalus genus Polymorphus and notes on the status of the name Prolificollis, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(2), April 1939, pp. 129-131, 3 figs.

P. marilis n. sp. from a scaup duck described and figured; the two generic names mentioned in the title are synonyms.

Diseases and Parasites: Sylvatic plague

Jellison, William L. Sylvatic plague: Studies of predatory and scavenger birds in relation to its epidemiology. Public Health Service. Public Health Reports (Supt. of Documents, Washington, D.C. 5 cents a copy), 54(19), pp. 792-798, 1 table, May 1939.

References to a few notes in previous literature on possible transmission of plague by birds, and account of the author's observations and experiments in southwestern Montana. The author's conclusions are: "Predatory species, especially, transport flea-infested rodents and serve as accidental hosts of rodent fleas. The abundance and variety of rodent fleas found in the nest of a burrowing owl suggest that this species may prove of particular interest. Casts from predatory birds fed plague-infected guinea pig tissue were consistently infectious. Infection was not demonstrated in two instances in

which portions of a plague-infected ground squirrel found dead in nature were used for the infective feedings. Tests on the infectivity of feces of birds being fed plague tissue were consistently negative, but were restricted to a few species." Bibliography of 8 titles.

Diseases and Parasites: Sylvatic plague

Stewart, M. A., and D. B. Mackie. The control of sylvatic plague vectors, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $2.50 a copy), 28(3), Nov. 1938, pp. 469-480, 5 tables.

Sylvatic plague continues to spread in the United States. Control should be directed against the primo vectors--fleas--as well as against their rodent hosts. The present report is based on laboratory experiments. Authors' conclusions: "The control of fleas in rodent burrows, as well as control of the rodents themselves, necessary in the effective suppression of sylvatic plague may be accomplished by fumigation with methyl bromide. All stages from the egg to the adult are susceptible to this fumigant, but the adults are more easily killed than are the immature stages. It appears from field tests, that the dosage of liquid methyl bromide, approximately 10 cc per burrow opening, ordinarily used to kill ground squirrels is also sufficient to kill the fleas in all stages of development. It is believed that the spread of bubonic plague occurring through the transportation of plague-flea infested grains, cereals, etc., may be effectively checked by fumigating these cargoes with methyl bromide and that the materials so treated will not in any way be rendered unfit for human consumption." Bibliography of 14 titles.

Diseases and Parasites: Tick, Rabbit

Herman, Carlton M. Occurrence of larval and nymphas stages of the rabbit tick, Haemaphysalis leporis-palustris, on wild birds from Cape Cod, Bul. Brooklyn Ent. Soc. (311 East 4th St., Tucson, Ariz. 60 cents a copy), 33(3), June 1938, pp. 133-134.

Records for 6 species of birds trapped on Cape Cod, Mass., and references to the literature. Apparently the rabbit tick has been found on 47 species of birds of the eastern United States. Some of these may be natural, rather than accidental, hosts and may have to be taken into consideration if control of the tick--a vector of tularemia--should ever be necessitated.

Diseases and Parasites: Tick, Snowshoe hare

Green, R. G., et al. Rabbit tick populations on the Lake Alexander area, 1931-1938, Minnesota Wildlife Disease Investigation (Dept. of Bacteriology, University of Minnesota, Minneapolis), Nov. 1938, pp. 80-86, tables 38-39, 4 graphs, mimeographed.

Of ticks and fleas infesting the hares, the rabbit tick (Haemaphysalis leporis-palustris) is by far the most abundant and doubtless most important. The tick populations are discussed and graphed in relation to those of the hare; their peaks occur together. When the hares numbered from 350 to 475 per

square mile, maximum tick infestations were around 4,000 per animal, but when the rabbits were only 30 to 250 per square mile, the tick maximum was halved. A principle deduced from the study, which probably has broad application, is "that the most effective control seen in nature is that exercised by variations in the size of host populations."

Diseases and Parasites: Trematode in shore birds

Young, R. T. The life history of a trematode (Levinseniella cruzi?) from the shore birds (Limosa fedoa and Catoptrophorus semipalmatus inornatus), Biol. Bul. (Prince and Lemon Sts., Lancaster, Pa. $1.75 a copy), 74(2), April 1938, pp. 319-329, 2 figs, 2 tables.

Locality: La Jolla, Calif.; the birds concerned: marbled godwit and western willet; intermediate hosts: snails and sand crabs. Practically all crabs over 6-7 mm. in length are infested but the infestation of the birds is light. Bibliography of 12 titles.

Diseases and Parasites: Tularemia

Green, Robert G. Tularemia, a common disease in wild animals, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn. 15 cents a copy), 67, April 1939, pp. 14-16, 2 photos.

Tularemia affects numerous kinds of wildlife in Minnesota, being most serious in relation to the cottontail, ruffed grouse, muskrat, and mice. It is spread chiefly by ticks; of these the rabbit tick seldom bites man and the wood tick has a rather low rate of infection. The chance of a human contracting infection from tick bite is small, almost negligible if all ticks are promptly removed. Tularemia is most prevalent in spring and fall and its incidence reduces rapidly in cold weather. Opening the season on rabbits at the middle of October or later reduces the hazard to the minimum.

Ecology: Biologic balance

Hanson, Herbert C. Ecology in agriculture, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 20(2), April 1939, pp. 111-117.

There is enough mention of wildlife in this article to make it worthy of perusal by those interested in biologic balance. "Permanent agriculture must be in adjustment with the environment" and the services of scientists are required to accomplish that end.

Ecology: Census methods

Groffenius, M. J. A method for determining the relative abundance of Microtus pennsylvanicus, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 199-200.

Author's abstract: "Abundance of M. pennsylvanicus can be determined by noting their effect on oatmeal bait-lines placed in different cover types."

Ecology: Census methods

Leslie, P. H., and D. H. S. Davis. An attempt to determine the absolute number of rats on a given area, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 8(1), May 1939, pp. 94-113, 3 figs., 3 tables.

Report on a field experiment in Africa that is of value to those interested in theories of animal populations. Authors' summary: "The results from a series of trappings, all done on the same area in Freetown, Sierra Leone, have been analysed in the light of a theory of trapping, which is merely an adaptation of the elementary kinetic theory of gases. The development of this theory is given in full and the arithmetical analysis of the results has revealed nothing which is inconsistent with the fundamental hypothesis. The probable number of R. rattus on this area has been calculated and the errors involved in this type of estimate are discussed, leading to certain suggestions for the design of such experiments in the future." Bibliography of 6 titles.

Ecology: Census methods

Scott, Thos. G., and Lyle F. Selko. A census of red foxes and striped skunks in Clay and Boone Counties, Iowa, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(2), April 1939, pp. 92-98, 2 figs., 3 tables.

Authors' abstract: "A census technique for red foxes and striped skunks developed in Clay and Boone Counties, Iowa is discussed. The data evidenced the following populations: Clay County, foxes, 117; skunks, 945; Boone County, foxes, 351; skunks, 2,331. The numbers of these fur-bearers appeared to vary with the acreage of land having certain slopes. Slopes under 5 to 10 percent and bottom lands appeared largely unattractive to breeding animals of these species."

Ecology: Farm birds

Van Deventer, Wm. C. Studies on the ecology of secondary communities in a deciduous forest area, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 20(2), April 1939, pp. 198-216, 5 figs., 2 tables.

Ecological classification of formerly forested areas in northern Illinois as modified by man and their resident bird population. The classification into 6 communities is based on the absence or presence of trees and shrubs. Their characteristics as to other details are discussed especially as to the occurrence of birds. "Animals which survive in an agricultural area do not constitute a well-defined ecological group, but rather represent the remnants of integrated primitive communities which have survived because of special circumstances in each case." The total density of birds in the area in winter was estimated to be 243 per square mile in 1936, and 282 in 1937; corresponding figures for the

summer populations are: 504 and 576. There is a bibliography of 20 titles.

Ecology: Mosquito control operations

Cory, Ernest N., and S. L. Crosthwait. Some conservation and ecological aspects of mosquito control, Journ. Economic Entomology (E. N. Cory, College Park, Md. 75 cents a copy), 32(2), April 1939, pp. 213-215.

Two sections of this paper relate to vertebrates. One discusses "salinity in relation to muskrat food." Ditching allows inflow of salt water that is injurious to the important food plant three-square (Scirpus olneyi), but can be controlled by dikes and tide gates. Some ditched marshes yielded more, others fewer, muskrats and further study is needed for appraising the effects of ditching on these animals. Their food, however, has been preserved. As to "ditching in relation to duck food," the writers say that the growth of wigeongrass (Ruppia maritima) can be preserved by cutting shallow laterals from the main deeper ditches into ponds that otherwise dry up in summer. Deep ditches destroy the value of the ponds. Some ponds have been benefitted by deepening and new ones have been formed, sods from ditches being used to build up their banks. Ditching should be done at other seasons than the nesting period of wild fowl. Increases in black ducks have been noted on the marshes where the favorable methods mentioned have been applied. "An attempt has been made to do those operations necessary for mosquito control in such a manner as to interfere the least with the balance of wildlife as it existed at the beginning of the work, to improve conditions for wildlife feeding, breeding and resting and to collect data upon which definite conclusions, instead of conjectures based on prejudices, can be formulated."

Ecology: Peat lands

Dachnowski-Stokes, A. P. Improvement of unproductive and abandoned peatland for wildlife and related uses, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.50 a copy), 20(2), April 1939, pp. 187-197, 1 fig.

References to extent of peat lands in the United States and their classification. "It is recognized also that much progress has been made by the U. S. Biological Survey toward a solution of the propagation of plants valuable for wildlife, and the relationships of various species of birds and other animals to native environmental conditions. These and other investigations on changes in plant cover, rate of recovery, wildlife populations and their requirements, have not been considered, as yet, in relation to the three classes of peatland mentioned above. Research along the lines indicated would clarify an understanding of rehabilitating requirements, developmental stages of vegetation, and the plant and animal communities which are effective in changing the appearance of habitats, or have an important temporary or permanent effect upon peat areas that have been inundated. Restoration, improvement, and use of these different types, primarily for wildlife, are in keeping with conservation and land utilization policies. They differ only in the results sought for, that is, in preventing ill-advised and unsuccessful farming operations, in applying restorative measures to meet the needs of different kinds of peatland conditions, and in averting burning, deterioration, and abandonment of a valuable national resource."

Suggestions are made for the improvement of peat areas along river courses bordering lakes and ponds, and on upland. Proposals are made for future peat investigations and problems are listed under 10 headings.

Ecology: Populations, fluctuations, fur animals

Mohr, Carl O. Trappers' reports reveal furbearer fluctuations in Illinois, Illinois Conservation (Dept. of Conservation, State House, Springfield, Ill.), 4(1), mid-winter 1938-1939 (Feb.), pp. 4-5, charts.

Analysis of 6,000 trappers' reports for the period 1929-36. Fluctuations in the catch, as affected by prices and other factors including actual abundance of the animals, are discussed for foxes, the muskrat, mink, opossum, raccoon, and weasels, and skunks. In summary "muskrat populations have increased steadily x x x mink and coon populations may not have changed much except locally and x x x other predatory furbearers except weasels, have attained high populations which are now either lower or declining."

Ecology: Sonoran biotic province

Dice, Lee R. The Sonoran biotic province, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 20(2), April 1939, pp. 118-129, 1 map.

Definition, outline (mapped), discussion, and lists of characteristic species of a zoogeographic area that includes parts of California, Nevada, and Arizona. Bibliography of 22 titles.

Ecology: Territory, great horned owl

Baumgartner, Frederick M. Territory and population in the great horned owl, The Auk (Rudyard Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(3), July 1939, pp. 274-282, 2 figs.

Report on studies near Lawrence, Kansas, and Ithaca, N. Y. Author's summary: "(1) The Great Horned Owl maintains a definite territory throughout the nesting season; (2) the male's territory is not only patrolled against all others of its species with the exception of its mate and young but also serves as the range in which both birds hunt for food; (3) in most cases resident birds are found near the nest site at all seasons of the year with the possible exception of a few months in the late summer and fall; (4) normally no other large species of owls are found within the boundaries of the range set up by the male Horned Owl; (5) Horned Owl populations are limited chiefly by human molestation and man-made changes in their environment that result in a scarcity of cover and less frequently in a lack of nesting sites and sufficient food. In optimum range the decided territorial requirements of the males probably determine the nesting density. Populations in such areas seem to average from one to three pairs of nesting owls to the square mile. Over most of the range of the species the nesting density is much lighter; (6) the fact that resident Great Horned Owls throughout most of the year restrict their search for food to a relatively small area has an important bearing upon the economic status of this species." Bibliography of 6 titles.

Education: Conservation clubs

Gutermuth, C. R. Conservation education in Indiana, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 9(2), May 1939, pp. 8-9, 3 photos.

Conservation clubs, numbering 874, paid for producing fingerling fishes, propagating game birds and raccoons, mostly reinvest the receipts in allied projects. Their influence has been good in reducing law infringement. They aid in tree planting, emergency feeding of wildlife, and in soil and water conservation. State representatives attend club meetings and give illustrated lectures there and in the schools.

Education: Public schools

Anon. Units in conservation for West Virginia public schools, Vol. 1--Elementary Schools (Grades 1-8), 120 pp., illus; Vol. 2--Secondary Schools (Grades 7-12), 128 pp., illus. Conservation Commission and State Department of Education (Charleston, W. Va.), April 1939.

The courses suggested for the different grades are presented as to general objectives, specific aims, approach, activities, integration, social relations, and evaluation. Each is accompanied by a bibliography. A check list of vertebrates (except fishes) of the State by M. G. Brooks is included in each volume.

Education: Wildlife extension

Warburton, C.W. The educational work of the Extension Service with reference to wildlife conservation, U. S. Dept. of Agriculture (Washington, D. C.) Extension Service Circ. 304, 6 pp., mimeographed, March 1939.

Fitting wildlife into land-use programs; the farmer is vital to the movement and his cooperation must be obtained. Extension work in Texas is described as an example, and encouragement of farmer-sportsman cooperation is noted for Missouri and West Virginia. The main objective, however, is education through 4-H clubs, progress in which is reported in several States. Conservation camps especially facilitate this phase of the work.

Food Habits

Saari, Matt. Food for forest folk, Minnesota Conservationist (Dept. of Conservation, State Office Bldg., St. Paul, Minn. 15 cents a copy), 69, June 1939, pp. 4-6, 3 figs.

A compiled account with some original observations, pertaining chiefly to deer, moose, and grouse. In compiling, some things have been taken too literally as mergansers eating birch and juniper, and the blue heron taking spruce. Such things are incidentally, perhaps even accidentally, ingested.

Food Habits: Barberry distribution

Molander, L.W. Battling the barberry, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn. 15 cents a copy), 67, April 1939, pp. 17-18, 2 photos.

Barberries are the spring host plants for the fungus that causes stem rust of wheat, oats, barley, rye, and some 25-30 native grasses. Birds, rodents, and domestic stock scatter the seeds in viable condition. The robin, catbird, cedar waxwing, and "blackbirds" are specified. No aggressive actions are recommended except against the barberry.

Food Habits: Bobcat

Hamilton, W. J., Jr., and Russell P. Hunter. Fall and winter food habits of Vermont bobcats, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(2), April 1939, pp. 99-103, 1 table.

Authors' abstract: "Stomachs of 140 bobcats taken in Vermont from fall to late winter over a three-year period were examined. The results indicate that the chief food of the bobcat consists of deer (probably much of it carrion), mice, chiefly Microtus and Peromyscus, varying hares and cottontails, porcupines, squirrels, grouse, shrews, muskrats, carrion, and blue jays. Less frequent items are red and gray foxes, grass, poultry, fishes, mink, and insects." Bibliography of 7 titles.

Food Habits: Corvidae

Imler, Ralph H. Comparison of the food of white-necked ravens and crows in Oklahoma, Wilson Bulletin (University of Michigan, Ann Arbor. 60 cents a copy), 51(2), June 1939, pp. 121-122, table.

Report on stomach contents of 18 ravens and 14 crows picked up at a bombed roost. Nearly half of the food of each group was made up of corn and sorghum grains; with respect to other items, the crow seemed more beneficial than the raven.

Food Habits: Coyote

Bond, Richard M. Coyote food habits on the Lava Beds National Monument, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 180-198, 3 figs., 2 tables.

Author's abstract: "From 273 droppings and 9 stomachs taken, in all months but February, on the Lava Beds National Monument (adjacent to the Tule Lake Wildfowl Refuge) in Siskiyou and Modoc counties, California, 706 probably non-carrion food items were identified. Of these, 481 or 65.18 percent were mammals (19 species: Felidae 1, Sciuridae 6, Heteromyidae 2, Cricetidae 5, Erethizontidae 1, Ochotonidae 1, Leporidae 2, Corvidae 1); 26 or 3.67 percent

were birds or bird eggs (7 species: Anseriformes 3, Galliformes 2, Passeriformes 2); 8 or 1.08 percent reptiles; 145 or 19.65 percent insects; and 46 or 6.23 percent were vegetable items. Evaluation of effects (as distinguished from activities) of the coyotes is complicated by the occasional or continuous presence of at least 34 other predatory vertebrate species in the area. '... although, to some extent, every vertebrate species on the ... Monument affects the coyote, and is in turn directly or indirectly affected by it, it appears that the coyote plays rather a minor role in the ecology of any of the species it preys upon.' No evidence was found indicating necessity of coyote control on the Lava Beds National Monument. Bibliography of 8 titles.

Food Habits: Deer damage

Welsh, Stanley. Deer damage in the Brule River valley, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(6), June 1939, pp. 41-46, 1 map, 2 tables.

At a deer yard and on nearby pine plantations, and grounds surrounding summer homes on a State forest. Species principally affected: white cedar, balsam fir, and white, jack, and Norway pines. Percentages of survival and damage on several sections of a plantation are tabulated; average survival 60 percent, of which 70 percent are damaged.

Food Habits: Ducks

Cottam, Clarence. Food habits of North American diving ducks, U. S. Dept. of Agriculture Technical Bul. 643 (Supt. of Documents, Washington, D. C. 30 cents a copy), 139 pp., 10 pls. (4 col.), 5 figs. 26 tables, April (May) 1939.

This publication completes the series of formal reports by the Biological Survey on food habits of ducks, except for the shoveler and the mergansers and these have been informally treated (Auk, 39, 1922, pp. 380-386; Leaflet BS-83, 1937, pp. 11-12). The present bulletin deals with 22 species of river and sea ducks for each of which range and habits are generalized and food habits detailed. Material permitting, the food of the young is separately discussed. Bibliography of 97 titles. The publication is well illustrated, relaxation in economy requirements of years standing allowing the presentation of 4 excellent colored plates figuring 16 species.

Food Habits: Ducks

Martin, A. C., and F. M. Uhler. Food of game ducks in the United States and Canada, U. S. Dept. of Agriculture Technical Bul. 634 (Supt. of Documents, Washington, D.C. 40 cents a copy), 156 pp., 153 pls. (frontispiece col.), 137 figs., 11 tables, March (May) 1939.

The illustrations considerably exceed the text of this publication, which, therefore, seems directed primarily toward recognition of duck foods. Statistics accompanied by graphs based on nearly 8,000 stomach analyses show the importance of the principal items in 6 divisions of the United States and 2 of Canada.

The succeeding section of the bulletin is designed to facilitate identification of some 200 of the more important foods by means of a series of outline descriptions, illustrations, and distribution maps; it comments also on the value of the plants to waterfowl, their environmental preferences, and methods of propagation. Seventy-eight pages (including many line drawings and distribution maps) are devoted to plant, and 4-1/2 to animal, foods. Forty pages contain discussion of the propagation of waterfowl food plants and of environmental conditions affecting them. Harvesting, field care, storage, shipment, planting and yields are discussed. Fluctuating water levels, character of bottom, turbidity silting, action of waves, currents, and ice, salinity, alkalinity, and acidity are physical factors of the environment that receive consideration both as to their effects and possible means of counteracting them. There is a discussion of competitive plants and their control partly based on original investigations especially of the introduced water chestnut. Injurious animals and other adver factors as drainage and pollution also receive consideration. There is a bibliography of 91 titles and an ample index.

Food Habits: General

Hosley, N. W. The place of foods in wildlife management, Pennsylvani Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 9(2), May 1939, pp. 6-7, 31, 6 photos.

General discussion of methods of learning about wildlife foods, their utilization, and nutritive values, and of the important foods of animal groups including waterfowl, ruffed grouse, pheasant, bob-white, woodcock, white-tailed deer, cottontail, snowshoe hare, gray squirrel, raccoon, and red fox.

Food Habits: Merganser, American

Caldwell, Cyril. The feeding habits of American mergansers, — Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 25 cents a copy), 53(4), April 1939, pp. 53-55.

Observations of their feeding extensively upon eels. "In view of the fact that eels are said to be detrimental to valuable food fishes, such as trout and salmon, in that they destroy quantities of their spawn, Mergansers should be given credit for helping in this way to preserve nature's balance."

Food Habits: Owl, Barn

Bolander, Gordon. Barn owl pellets, The Gull (1695 Filbert St., San Francisco, Calif.), 21(8), Aug. 1939, p. 76.

Report on 1,726 pellets collected from March 1938 to May 1939. Meadow mice averaged about 50 percent of the occurrences in all lots; other high items were pocket gophers and white-footed mice.

Food Habits: Partridge, European

Anon. The food of partridge chicks, Imperial Chemical Industries (Millbank, London, S.W. 1, England) Game Researches, 18, 8 pp., 2 figs., June 1939.

Summary of paper of same title abstracted in WILDLIFE REVIEW, No. 20, May 1939, p. 8, and management observations based on the findings.

Food Habits: Pheasant

Chaddock, T. T. Pheasant food, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(5), May 1939, p. 44.

Crop contents of a winter specimen collected where there had been no artificial feeding. The principal items were poison sumac seeds and grasshoppers and their eggs. From their appearance, the adult insects are thought to have been dead and dry when eaten, but the eggs had been dug up in their capsules; 563 were counted.

Food Habits: Squirrel, Fox

Whitaker, H. L. Fox squirrel utilization of Osage orange in Kansas, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(2), April 1939, p. 117, 1 pl.

Author's abstract: "In eastern and central Kansas the seeds of Maclura pomifera are favored food of Sciurus niger rufiventer. The larger trees furnish summer nesting sites, and the hedges serve as satisfactory feeding and refuge cover. Year-round residence depends upon the presence of mature trees of large species that decay readily to make hollows suitable for winter quarters."

Food Habits: Squirrel, Red

Mollenhauer, Wm., Jr. Table Mountain pine--squirrel food or timber tree?, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(5), May 1939, pp. 420-421, 1 photo.

Near Huntington, Pa., red squirrels to get the cones gnaw off so many branches that the trees appear pruned.

Food Habits: Utility of legumes

Graham, Edward H. Legumes: Their erosion-control and wildlife values, U. S. Soil Conservation Service (Washington, D. C.), TP 23, 102 pp., mimeographed, June 1939.

Legumes are discussed as to their value in agriculture including their roles in nitrogen fixation, as weeds, and as poisonous plants, as hosts of insects and fungi, and in erosion control. About half of the publication is devoted to a discussion

of legumes by genera, containing descriptive and distributional notes, and recording their known wildlife values. There are indexes of birds and mammals accompanied by lists of the legumes they are known to utilize, a 10-page bibliography and a subject index. A useful compilation.

Food Habits: Woodcock

Pettingill, Olin S., Jr. Additional information on the food of the American woodcock, Wilson Bulletin (University of Michigan, Ann Arbor. 60 cents a copy), 51(2), June 1939, pp. 78-82, 2 tables.

Report on 70 stomachs from Nova Scotia examined by the Biological Survey. Lists of food items and their frequency of occurrence both of the lot mentioned and of another (of 124) from New York and New Jersey previously reported upon. The more important foods are earthworms, spiders, beetles, and flies.

Life Histories: Chipmunk, Eastern

Allen, Elsa G. The habits and life history of the eastern chipmunk, Tamias striatus lysteri, New York State Mus. Bul. (Albany), 314, 122 pp., 43 figs., 11 tables, Sept. 1938.

This summary of the literature (8 pp. of bibliography) and of personal observation and experiment during 5 years by a matron of a busy household, like Mrs. Nice's song-sparrow studies, shows what can be done nearby and inexpensively, granted the scientific temperament and the will to do. The report deals with everything that it could reasonably be expected to cover, treating in most detail burrowing, breeding, and feeding habits, and hibernation. Data of interest to specialists on other groups than mammals relate to insect guests in the burrows and to ectoparasites. A thorough study, well reported.

Life Histories: Ground squirrel, Townsend's

Svihla, Arthur. Breeding habits of Townsend's ground squirrel, Murrelet (234 Johnson Hall, University of Washington, Seattle. 50 cents a copy), 20(1), Jan.-April, 1939, pp. 6-10.

This resident of south-central Washington, quite plentiful in the locale studied in 1934, was much reduced thereafter possibly by bubonic plague. General habits are briefly mentioned and breeding habits treated in more detail. Mating begins shortly after emergence from hibernation; gestation period is about 24 days; litters average 4.75 individuals. Progress in size, weight, and hairing and other characters in captivity is described. Estivation, which passes into hibernation begins in late June about 6 months after spring appearance. Bibliography of 6 titles.

Life Histories: Grouse, Prairie

Henderstrom, F. N., Jr. A study of Wisconsin prairie chicken and sharp-tailed grouse, Wilson Bulletin (University of Michigan, Ann Arbor. 60 cents a copy), 51(2), June 1939, pp. 105-120, 2 figs., 9 tables.

Report on a Farm Security Administration project. Notes are given on population density on this and other areas; it varies from a bird to 13 to one per 100 acres. Mating behavior and dancing grounds are described; some of the latter were used by both species. Nesting chronology; number, fertility and viability of eggs; seasonal decline in size of clutch; causes of nest failures; and occupancy of cover types are tabulated and discussed for each species. The effect of changes in succession on the birds, including those due to man, are described. Man once, by accident, made in central Wisconsin the best prairie grouse habitat in the Middle West; can he now, by design, repeat the feat? Management studies on the Necedah project are intended to answer that question. Bibliography of 22 titles. →

Life Histories: Grouse, Ruffed

Fisher, Lee W. Studies of the eastern ruffed grouse in Michigan; Michigan State College, Agr. Expt. Sta. (East Lansing) Technical Bul. 166, 46 pp., 9 figs., 12 tables, June 1939.

A condensed account of several years' technical and obviously successful investigations of Bonasa u. umbellus. Reports on census and habit studies, each separately summarized, make up the bulk of the bulletin. Fluctuations are not uniform throughout the State; the birds prefer the margins of cover areas; densest population was one grouse to 3 acres, average 1 to 5. Ninety percent of the eggs hatched; young were confined in wire netting enclosures about nests and fed there from 1 to 6 days after hatching; the female could be readily caught there with a fly net for banding or observation; average range of a grouse brood was 40 acres; horned owl and house cat are the most important predators; parasites and diseases appear to be a major factor in the decimation of the birds in Michigan; notes on important foods are included. Bibliography of 7 pages.

Life Histories: Pheasant

Randall, Pierce E. Management of the ringneck pheasant in early winter, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(4), July 1939, pp. 8-9, 30, 6 photos.

Analysis of winter cover available to pheasants in some of the best range in the State; weedy stubblefields, hand-picked cornfields, conifer plantations, waste lands, and hedgerows were the principal types. The chief food is corn but seeds of cornfield weeds also are of value. "There is good reason to believe that standing cornfields determine to a large extent the number of pheasants that an area in Pennsylvania will winter." Mortality in winter is no more than may be considered "normal." "Predation does not appear to be a limiting factor." Cover distant from food is not utilized.

Life Histories: Plover, Piping

Authors. The piping plover. Birds of Long Island, No. 1 (Bird Club of Long Island, Oyster Bay, N. Y. $1.00 a copy), 18 pp., 3 pls. (1 col.), 4 tables, May 1939.

Life history by Le Roy Wilcox, injury feigning by Allan D. Cruickshank, and random notes by J. T. Nichols.

Life Histories: Quail, Valley

Emlen, John T., Jr. Seasonal movements of a low-density valley quail population, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(2), April 1939, pp. 118-130, 3 figs., 1 table.

Author's abstract: "The movements and social relations of valley quail, Lophortyx californica vallicola, on the University of California Farm at Davis were followed in detail through 1937. Colored markers placed on legs and tails served to identify individuals in the field. On January 1 there were 113 birds in four coveys. Extra-covey movements were restricted by inter-covey social barriers. During late February and March (mating season) yearling birds wandered extensively beyond the covey boundaries, effecting a 50% reduction in population on the winter territories. Mated pairs left the coveys for nesting early in April. Summer movements, normally restricted by nesting ties, occurred following nest failure or loss of mate. Despite early displays of social intolerance amongst broods, 4 coveys developed during the fall and half of the original birds were relocated on the territories of the preceding winter." Bibliography of 6 titles.

Life Histories: Skunk

Allen, Durward L. Winter habits of Michigan skunks, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 212-228, 4 pls., 4 tables.

Author's abstract: "In a southern Michigan study of the eastern skunk (Mephitis m. nigra), 143 individuals were handled by box trapping, steel trapping, and the digging of burrows. In a series of weights, 33 males averaged 1,905.1 grams and 30 females averaged 1,411.8 grams in late winter. Thirty-six breeding season autopsies indicated that the older females (separated by weight) bred in late February and young females about a month later. Of 26 burrows excavated, 11 contained skunks. In each of two burrows one male was found with 10 females. In no case was more than one male present with females. Female skunks became inactive in winter earlier than males; hence trapping late in the season takes mostly males and preserves the females as breeders. Conversely, the digging out of winter dens will take a high percentage of females and destroy the source of a possible new fur crop." Bibliography of 27 titles.

Life Histories: Sparrow, English

Weaver, Richard L. Winter observations and a study of the nesting of English sparrows, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass. 75 cents a copy), 10(2), April 1939, pp. 73-79, 2 figs.

Study at Ithaca, N. Y., of flocking, winter range, and nesting. There was great disparity in numbers between the wintering and breeding populations of the same area.

Life Histories: Swallow, Tree

Chapman, Lawrence B. Studies of a tree swallow colony, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass. 75 cents a copy), 10(2), April 1939, pp. 61-72, 1 fig., tables.

A second paper reporting on an additional 4-years' study at Princeton, Mass. Data for the entire course of the work--7 years--are summarized in a table to show such generally interesting features as numbers of adults and young returning to the colony, numbers of eggs, and reproductive efficiency. Competition with bluebirds and house wrens is described. Numerous parasitic flies (Protocalliphora) were produced at the expense of the fledglings but caused little, or no, mortality. Bibliography of 14 titles; the results of some of these published studies are abstracted in the text.

Life Histories: Thrush, Bicknell's

Wallace, George J. Bicknell's thrush, its taxonomy, distribution, and life history, Boston Soc. Nat. Hist. Proc. (234 Berkeley St., Boston, Mass.), 41(6), pp. 211-401, tables.

This publication, coming to hand too late for adequate abstracting, has been accorded several very favorable reviews in ornithological magazines. Begun as a purely life history study, taxonomic investigation was found necessary to fix the status of Bicknell's thrush; this led to a revision of this form and its allies, the results of which are presented. Distribution and migration records are discussed in the text and tabulated in an appendix. The bulk of the paper is devoted to the home life of this thrush as observed on Mount Mansfield, Vermont; it goes into all phases of the bird's activities in detail. There is a comprehensive summary, and an 8-page bibliography.

Life History: Turkey

Latham, Roger M. Pennsylvania's wild turkey range, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(4), July 1939, pp. 3-6, 5 photos, 1 map.

The present range, some 2,000,000 acres, is largely restricted to oak-pine forests on certain geological formations in the southern half of the State. The original range was much larger and the decrease seems to have been brought about chiefly by agricultural and lumbering activities together with loss of chestnut trees through blight. Environmental factors discussed include climatic conditions, food, cover, range, and disease. In addition hunting, both legal and illegal, are considered. Increase in deer has been observed in many instances to be followed by decrease in the turkey, grouse, and rabbit populations.

Life Histories: Woodpeckers

Bent, Arthur C. Life histories of North American woodpeckers, U. S. National Museum Bul. 174 (Supt. of Documents, Washington, D. C. 50 cents a copy), 334 pp., 39 pls., 1939.

Continuation of a now lengthy and always useful series of volumes on life histories of North American birds. The specific accounts treat habits, including courtship and nesting, describe the eggs, plumages, food, behavior, voice, etc., and outline the distribution, and give information on migration. The treatment varies for the species according to the information available. The plates reproduce photographs of excellent quality. There is an extensive bibliography and full index.

Management: Apple trees

Bradbury, Harold M. Management of apple trees in Massachusetts, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 240-242, 2 pls.

Author's abstract: "To improve persistence of fruits, pruning and releasing in varying degrees and giving different exposures were tried. Best results were obtained from a 50% release to the south and west and no pruning of live wood. Grafts of Malus floribunda ("Bob-white") scions gave speedy and excellent returns, one grafted in 1936 bearing 12 apples in 1937. Grubbing around trees to remove competitive ground growth and the use of nitrates produced larger crops. Because of the difficulty and expense due to isolation, these trees are not sprayed and may become hosts to diseases and insects that would invade neighboring orchards. It is recommended that wild apple trees within 500 yards of commercial orchards be removed."

Management: Bob-White

Stoddard, Herbert L. Cooperative Quail Study Association (Thomasville, Ga.) Seventh Annual Report, 1937-38, 31 pp., June 1939.

Besides information of specific interest to Association members, this report contains a number of sections of general value in connection with wildlife management. One relates to the use of fire, a fuller account of which was abstracted in WILDLIFE REVIEW, No. 20, May 1939, pp. 19-20. Another discusses the wood cutting policies of paper mills in relation to game in the Southeast. In a division on hawks and owls, it is noted that "the most productive preserves appear to be those that wage no campaign against birds of prey other than 'blue darters'." On those preserves, however, "skunks, foxes, opossums, house cats, cur dogs, and certain egg-eating reptiles are systematically reduced in number. x x x Preserves that lay major stress on building up food supply and providing proper cover for quail, and exercise moderate control of important mammal and reptile enemies when and where this seems necessary appear to be on the right road so far as controllable factors are concerned. x x x We feel that crows, shrikes, blue jays, owls, and most of the hawks can be safely disregarded under conditions prevailing below the belt of ice and snow." A special case is

accipiters at dove fields where in the interests of good shooting they must be controlled. The use of pole traps is opposed on the grounds that they are indiscriminate and as generally used, unnecessarily cruel and inhumane.

Reports on experimental and practical work with game food plants relate to sericea lespedeza, sesbania, finger millet, pigeonpea, perilla, chia, and jackbean. Fall plantings especially designed to produce early spring food are discussed as to composition and management. "The seed consistently giving best results x x x consists of sixty pounds of Augusta vetch, thirty pounds of wild winterpea (Lathyrus hirsutus), ten pounds of bluestem wheat, and ten pounds of abruzzi rye; mixed together before planting." Additions to this mixture that are advisable under certain circumstances are discussed. Strains best adapted for producing fall grains also are listed. Experiments with dove field plants including hayseed and mammaloxi soybeans and Texas seeded ribbon cane are reported. Establishment and preservation of refuge cover is advised; wild plum and Chinese privet are especially recommended.

The report gives an account also of studies of mammals and fire ants. Blackhead in both quail and turkey is noted as of rare occurrence.

Management: Cottontail

Gerstell, Richard. A progress report on Pennsylvania's new rabbit program, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(3), June 1939, pp. 4-5, 31, 2 photos.

After a 20-year period of decline in the rabbit population, steps were taken to improve food and cover, provide retreat areas, and restock with native, rather than imported, animals. Progress during 2 years is reported. All expenses figured in transplanting native rabbits cost 35 cents per animal, less than half the expense for imported cottontails.

Management: Farm game

Anon. Game management. What's new in farm science. Part I of the Ann. Rep. Director Agr. Expt. Sta., University of Wisconsin (Madison) Bul. 442, Nov. 1938, pp. 48-51, 1 graph.

Three topics are discussed. Ups and downs of quail furnish clues to best management. A graph shows variations in the quail population of the Prairie du Sac area, so long studied (1929 to 1938) by Errington, Gastrow, and Leopold. Lows seem to be in response to killing winters but also coincide with lows of the grouse cycle; the quail peak in 1933 also coincided with that of grouse and rabbits. Winter losses are greatest when the birds are most abundant. "From these data," the report says, "has been derived the 'Errington Theory of Predation' first proposed by the originator of this investigation," to the effect that predators get more of the birds when they are abundant, fewer when they are scarce. The management deduction is that "it is not necessary to destroy hawks and owls to protect quail in Wisconsin. A more practical way x x x is to furnish more food and cover."

[Comment. The "Errington theory of predation" is a misnomer. The theory is essentially that of predation tending to be proportional to population urged by McAtee in 1932, but earlier stated in its essentials by Beal in 1909. Forbes 1880 and Muir 1931 came near to it and probably others also have done so.]

Why do game birds nest in hayfields? They continue to do so despite availability of other cover and many nests are destroyed. Flushing bars do some good if attentively used but in practice often fail to save the birds or nesting "islands" for them. Spring-sown grain, making lower growth by nesting time, is not so attractive as fall-sown fields, but is not so productive over much of the State, hence probably will not be used much more commonly than at present. If Wisconsin agriculture continues about as it is, wholesale destruction of birds' nests in hayfields will recur.

Mature, well-developed pheasants survive best. From an investigation under way but not completed, the following trends of results are apparent: "(1) When very young pheasants are released, few of them survive. The older they are (up to the full-grown stage) the better their chance of survival; (2) pheasants too small for their age seldom, if ever, are able to live long after being released; (3) there does not seem to be much difference in the ability of wild and artificially-propagated pheasants to survive--provided they are full-grown when released--but what difference there is favors the wild birds. Wild-raised pheasants show less tendency to wander away from the range on which they are planted, and are more apt to form flocks in winter; (4) artificially-raised pheasants seldom weigh as much as wild ones of the same age; (5) localities differ in their ability to 'hold' birds--that is, keep them from wandering or drifting to new range. Poor food or cover may hold birds through the fall, but not through winter."

Management: Farm game

Vaughn, Ernest A. Wildlife report. Eastern Shore Development Project, Soil Conservation Service, U. S. Department of Agriculture, Feb. 1939. Maryland Conservationist (512 Munsey Bldg., Baltimore, Md.), 16(2), Spring 1939, pp. 16-17, 4 photos.

Mid-winter quail censuses showed great increase from 1936 to 1938 and a decided slowing down of the rate in 1939. "During late fall and early winter the preferred foods were cow peas, soy beans, partridge peas, and other wild legumes, bonne, sericea lespedeza, and ragweed." Experimental plantings of bonne produced a fair crop of seeds--an unexpected but satisfactory result so far north. Soy beans and clover sown near bird food patches and woody plantings will partially protect these from rabbit attack. Sericea lespedeza also proved a valuable winter food for cottontails. The author considers that too many of these animals are taken by enemies and that the predator problem is yet to be solved. Thinning hardwoods has improved conditions for wildlife, especially squirrels. "Wolf" trees were girdled and left for dens. Wild turkeys and deer have failed to establish themselves upon the project.

Management: Farmer-sportsman relationship

Cline, Justus H. Farmer-sportsman partnership, Maryland Conservationist (512 Munsey Bldg., Baltimore, Md.), 16(2), Spring 1939, pp. 14-15.

The destiny of wildlife is in the hands of landowners--public and private. The former should set an example of praiseworthy wildlife management. The average farmer is a conservationist but not a sportsman and should be approached on that understanding. The sportsman must join with the farmer in essential husbandry of natural resources. Conservation and restoration of wildlife must be definitely correlated with the nation's business and become a fixed habit of our lives. Production must precede harvesting. Farmers do not like the idea of commercializing wildlife but they do have an affection for it and desire to preserve it. They will welcome the cooperation of sportsmen to that end.

Management: Farmer-sportsman relationship

Montgomery, George A. Game plan that works, Capper's Farmer (Topeka, Kans. 5 cents a copy), 50(5), May 1939, pp. 13, 45, 3 photos.

Popular account of the Wood County, Ohio, system which has been described in articles abstracted in WILDLIFE REVIEW, Nos.: 8, April 1937, pp. 21-22; 12, February 1938, p. 13; 19, April 1939, pp. 27-28; and 20, May 1939, p. 29.

Management: Farmer-sportsman relationship

Short, A. W. Farmer-hunter relations in Ohio, Ohio Conservation Bul. (1106 State Office Bldg., Columbus, Ohio. 10 cents a copy), July 1939, pp. 16-17, 34, illus.

Statement of the difficulties (the same in Ohio as in other States) and of Ohio's way of solving them. Game management agents employed to cultivate good will of the farmers, organize cooperative hunting associations, and establish safety zones and propagation areas on farms. The State also has acquired 100,000 acres of public shooting grounds. Extension has been carried on through youth groups, county agents, and vocational agriculture teachers. Sportsman clubs are taking steps to curb undesirable elements and "farmer-hunter relations are on the up-grade in Ohio."

Management: Feeding deer in winter

Teller, C. Roy. Feeding snowbound deer, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn. 15 cents a copy), 67, April 1939, pp. 8-9, 3 photos.

Notes on deer foods, exhaustion of supplies at winter yards, and renewing the supply by felling white cedar and other evergreens.

Management: Forest wildlife

Cook, David B. Thinning for browse, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 201-202, 1 pl.

Author's abstract: "Slashings in northern hardwoods are commonly used t produce browse but are costly to maintain. Moderate thinnings will produce con tinued crops of highly palatable browse without undue disturbance of the forest and at low cost."

Management: General

Bennitt, Rudolf. Ecology in wildlife management, Outdoor America (1167 Merchandise Mart, Chicago, Ill.), 4(7-8), May-June 1939, pp. 4-6, 9, 5 photos.

Wildlife management is applied ecology. Wildlife ecology is dynamic and must be managed to produce the results desired by man. Management must take into consideration other uses of the land and the welfare of wildlife itself. Three leading sections of the article relate to increase of food and cover, reduction of kill by man, and killing of predators. Predators have values of their own, predation is likely to be negligible where food and cover are abundant, and killing of predators does not necessarily increase the survival of prey species. The real limiting factor should be identified and modified; it may or may not be predation. Restocking may have value in the field of public relations, but seldom has any appreciable effect upon the game population or sufficient ecological justification. Refuges intended to feed a surplus into the general game supply should be designed with the cruising radius of resident species in mind. Trapping and removal is a better way of utilizing the product Refuges are justified for vanishing remnants and/or research and educational purposes. The best as well as most economical way of increasing the yield of a species is by production in nature through improvement of the range.

Management: General

Morton, James N. Stepping up game production in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(5), Aug. 1939, pp. 4-5, 26-27, 6 photos.

The three lines of endeavor that seem most essential are: "(1) Improving environment, (2) bettering farmer-sportsman relationships, and (3) making more effective the program of propagation and restocking. The first has chiefly involved cuttings (described in an article abstracted in WILDLIFE REVIEW No. 1(November 1938, p. 26), but also some construction of wildlife shelters and travel ways. The second is largely conducted through the Cooperative Game-Far Program (that has been frequently noticed in WILDLIFE REVIEW) but to some exte as well by educational efforts. Under the third head are noted improvements i the propagation and distribution of pheasants, wild turkeys, and cottontails.

Management: Harvest in relation to land use

Moss, A. E. Relation between take of upland game and agricultural land use in Connecticut, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 269-278, 10 figs., 1 table.

Author's abstract: "The Biological Survey research unit at Connecticut State College analyzed the take of game in the State for the years 1927-35 from the returns of hunters' licenses. These data were used in correlating the take of pheasants (Phasianus colchicus) and ruffed grouse (Bonasa u. umbellus) with the open cultivated and forested areas by towns and with the agricultural productivity of the towns rated from information furnished by the Agricultural Economics Department of the State College. The findings indicate that the pheasant population is closely related to soil productivity. The best agricultural lands produce greater returns to the hunter. Density of liberations does not seem to offset lack of soil quality or area in agricultural lands. The ruffed grouse population shows close relationship to forested areas but does not fluctuate with soil quality."

Management: Harvesting

Hicks, Lawrence E. A survey of hunting by permit-holders of controlled hunting associations, Wood County, Ohio, 1938, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 100, 20 pp., 4 figs., 22 tables.

A n annual report; that for 1937 is abstracted in WILDLIFE REVIEW, No. 20, May 1939, p. 29. This summary of returns from a questionary is accompanied by a bibliography of 18 titles, is carried out chiefly through tables and graphs, and is epitomized under 24 heads. It relates chiefly to pheasants but contains information also on Hungarian partridges and rabbits. Farmer hunters outnumber other local hunters 3 to 1 and outside hunters 10 to 1. Average head of game bagged per hunter for the season was: Pheasants 6.13, rabbits 5.39, and partridges 0.34. Illegal kill and crippling losses receive consideration.

Management: Harvesting bob-whites

Bennitt, Rudolf. Reports by quail hunters provide valuable information, Missouri Wildlife (Chamber of Commerce Bldg., Springfield, Mo.), 1(11), June 1939, pp. 9-10, 4 tables, 1 map.

Information derived from a 3,000-man questionary from which an 18 percent return was received. "The 573 cooperators, living in 74 counties, hunted 25,821 hours and killed 37,301 quail. This represents an average, per hunter, of 45.1 hours in the field, 65.1 birds killed, and 1.44 birds killed per hour." Hunters using dogs had 19% greater success than those who did not. The evidence indicates lower quail populations in the prairie regions of the State than elsewhere. Hunting success decreased slightly through the season. The ratio of cocks to hens was 112.8:100.

Management: Harvesting waterfowl, Illinois

Hawkins, Arthur S., and Frank C. Bellrose. The duck flight and kill along the Illinois River during the fall of 1938, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 28(4), July-Aug. 1939, pp. 178-186, 1 fig., 3 tables.

Description of the flight and analysis of the kill. Tables show the proportion (2-99%) of mallards to other ducks present throughout the season; the composition of the kill at 18 duck clubs (mallard 60% of the shoal-water; ringneck 44% of the deepwater ducks); and a summary of crippling losses (average 36%). The total kill was about 65,000 or one to about each 44 ducks visiting the valley. Three of the strongest factors affecting the kill were: (1) unstabl water levels, (2) mechanical harvesting of corn, leaving much grain scattered i fields, and (3) refuges. "A storm of protest" came from hunters who believed the Chautauqua Lake Migratory Waterfowl Refuge spoiled their shooting. [To a degree, it would seem obvious, that is just what refuges are for.] Despite their protected status, many wood ducks were killed. The average kill at duck clubs was 6 legal ducks per man day. [The work should be continued as the questions it poses cannot be answered on the basis of one or a few seasons' observations.]

Management: Harvesting, Crippling loss, pheasant

Randall, Pierce E. Ringneck pheasant crippling losses, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(5), Aug. 1939, pp. 3, 31, 1 table.

Average 32 percent, reduced by retrieval of birds wounded by others, to 30.4 percent. Losses greater to novices and hunters without dogs. Details tabulated and discussed.

Management: Inventory

Johnson, F. W. Deer kill records--a guide to management of deer hunting, California Fish and Game (Ferry Bldg., San Francisco, Calif.), 25(2), April 1939, pp. 96-165, figs. 44-71, 29 tables.

A statistical study of data collected on the National Forests of California in 1935 and 1936. They concern 18,000 specimens of 5 races of deer and relate to weight; antler spread, number of points, diameter of beam, and condition; pelage; and flesh. Notes were kept also on place of kill, and to some extent on hunting effort and reward. Analysis was made by tabulating machines. Antler beam measurement is the most accurate single indicator of size in lieu c actual weights. Quality and size of deer proved to be inversely proportional t hunting effort. The season of prime of the animals is thoroughly discussed and management suggestions based on the findings in general are made. Bibliography of 9 titles.

Management: Planting for wildlife and erosion control

Gooding, Leslie N. Notes on native and exotic plants in Region 8, U. S. Soil Conservation Service (Albuquerque, N. Mex.) No. 247, 152 pp., 5 pls., mimeographed, Oct. 1938.

Miscellaneous notes on plants of the southwestern United States. The plants are listed in systematic order, and the remarks refer to their appearance, distribution, utility to animals and man, and use in erosion control (including in some cases planting directions). Indexed.

Management: Planting for wildlife and soil conservation

Clark, Arthur L. Cash for aiding wildlife, Missouri Ruralist (2206 Pine St., St. Louis, Mo. 5 cents a copy), 80(6), March 18, 1939, pp. 5, 18.

Notes on reimbursable practices of the Agricultural Adjustment Administration, of which Missouri farmers can take advantage.

Management: Planting for wildlife and soil conservation

Hill, R. G. Farmers receive payment by following soil building practices favoring wildlife, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(10), June 1939, pp. 4-5, 4 photos.

Review of reimbursable practices of the Agricultural Adjustment Administration that can be taken advantage of by farmers, and of a number of proposed additions to the program.

Management: Stocking quail, California

Anon. Why upland game refuges. Associated Sportsman (950 Pacific Bldg., San Francisco, Calif.), 6(5), May 1939, pp. 5, 11.

Some thirty no-shooting and keepered areas were established as part of the game bird restoration program. They are points of release for artificially propagated birds. "Game farm reared birds are not liberated to be shot. It just isn't possible from the standpoint of cost. In order to justify the expense for their rearing they must manage to produce a brood or two of youngsters." The refuges have served also as areas for study of problems associated with upland game bird restoration. Banding studies revealed that some quail lived from 3-5 years, and that overflow from the refuges was too slow to be satisfactory as a restocking measure. Trapping and transplanting were, therefore, resorted to; some of the trapping was done on urban and other areas where shooting is prohibited. Birds reared under natural conditions are superior for restocking and the cost of trapping them is but a fraction of what is required to bring a bird to maturity on a game farm.

Management: Winter feeding, squirrels

Chapman, Floyd B., and Luther L. Baumgartner. Winter feeding of squirrels, Ohio Division of Conservation (Columbus) Bul. 150, 8 pp. unnumbered, 1 pl., 1 table, May 1939.

Reprint of article of the same title abstracted in WILDLIFE REVIEW, No. 21, May 1939, pp. 13-14.

Natural History: Indication of age in quail

Leopold, A. Starker. Age determination in quail, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 261-265, 1 pl., 3 tables.

Author's abstract: "Working with 901 quail skins of nine American species in the University of California Museum of Vertebrate Zoology, it was found that the outer two primaries and the greater upper primary coverts of the juvenal quail plumage are normally retained through the postjuvenal molt and carried through the first year of life. The presence of these juvenal feathers, therefore, marks a quail as a chick of the previous breeding season. The mottled juvenal coverts are the most easily recognized and dependable of these age indicators."

Natural History: Migration

Lincoln, Frederick C. The migration of American birds (Doubleday, Doran & Co., Inc., Garden City, Long Id., N. Y. $4.00 a copy), 189 pp., 12 col. pls., 22 maps.

An up-to-date account of migration suitable for the general reader. Chapter headings indicating the nature of the contents are: Historical, Origin of migration, Mechanics of migration, Influence of the weather on migration, The dangers in migration, Times of migration, Distances covered in migration, Pelagic migration, Vagrant migration, Bird banding, The evolution of migration routes, and The flyway systems.

Natural History: Snake bite

Dittmars, Raymond L. Snake bites among domestic animals, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 40 cents a copy), N.S. 74(4), Part II, April 1939, pp. 383-388, 5 figs.

Most of the paper is devoted to a description of the mechanism of snake bite and to remedial measures. Implements for treating snake bite are illustrated. Instances are cited of losses of domestic animals both in the United States and other countries. About 1925, a questionary sent to county livestock inspectors in Texas evoked 60 replies that indicated an average loss of about 1 percent in cattle, sheep, and goats. One complainant reported a loss of approximately 9 percent of caracul-crossed sheep from snake bite on a ranch near El Paso about 1924.

Predation

Morse, Marius A. A local study of predation upon hares and grouse during the cyclic decimation, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 203-214, 4 tables.

Author's abstract: "From the spring of 1935 to the spring of 1938, population fluctuations of Bonasa umbellus and Lepus americanus were determined for a 2,520-acre forest area in northern Minnesota by periodic censuses using the strip sample method. Greatest population losses occurred in 1935 and 1936, and decimation in the ranks of the grouse apparently preceded that of the hare. Neither was successful in bringing forth any appreciable number of young in 1935. Field observations during the winter of 1935-36 over a period of 4 months indicated that predators, especially raptors, utilized a relatively large percentage of the hares and grouse that were discovered dead. In the same period, disease appeared to be of only very minor consequence as a factor directly responsible for the extensive hare mortality that was evident." Bibliography of 8 titles.

Predators

Swanson, Harold B. The predators of Minnesota, Minnesota Conservationist (Dept. of Conservation, State Office Bldg., St. Paul, Minn. 15 cents a copy), 69, June 1939, pp. 11-12, 4 figs.

General discussion of economic status of predatory birds, snakes, and fur animals.

Propagation: Grouse, Ruffed

Lehmer, C. B. The artificial propagation of ruffed grouse, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 9(3), June 1939, pp. 9, 32, 1 photo; 9(4), July 1939, pp. 11, 31-32, 1 photo.

History of progress in the handling of ruffed grouse in captivity. Despite all advance, limitation on the number of eggs, and a high degree of infertility, still prevent really large-scale production. Selection of birds for breeding success and refinement of methods seem to be the only hope for further advance. Bibliography of 18 titles.

Propagation: Irradiation results, mink

Bissonnette, Thomas Hume, and Everett Wilson. Shortening daylight periods between May 15 and September 12 and the pelt cycle of the mink, Science (Lancaster, Pa. 15 cents a copy), 89(2314), May 5, 1939, pp. 418-419.

Some minks exposed to gradually reduced periods of daylight for a few months attained primeness of fur earlier than control animals; others did not. The authors refer to the experiment as "rather crudely and irregularly carried out."

Research: Carrying capacity

Culley, Matt. The decagon for vegetation studies, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(6), June 1939, pp. 492-493, 2 figs.

Illustrations and description of decagons and their use in estimating density of vegetation. The procedure is somewhat slower than in the square-foot-density method but is more accurate.

Research: Food habits

Anon. What are the trout taking?, Game and Gun and the Angler's Monthly (34 Victoria St., London, S.W. 1, England. 1 shilling a copy), 16(164), May 1939, p. 316, figs.

Students of food habits have subjected wildlife to various indignities to which may be added the process here described. It is worth while, however, so far as it yields information without taking life. Illustration and description of a suction bulb and tube with which water is forced into a fish's stomach and withdrawn, carrying with it part of the food content.

Research: Histology in stomach analysis

Baumgartner, Luther L., and A. C. Martin. Plant histology as an aid in squirrel food-habit studies, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(3), July 1939, pp. 266-268, 4 pls.

Authors' abstract: "A technique for determining finely comminuted material from stomachs has been tested with some seventy fox squirrels' stomachs collected in Ohio. A combination clearing and mounting solution which makes possible the rapid examination of food materials is described and a detailed method of preparing temporary and permanent slides suggested. Permanent reference slides are essential for comparison. Some diagnostic characters including size and shape of stomata, cell patterns, structural peculiarities of cell walls, distinctive characters of conductive tissue elements, and specialized form of pubescence are illustrated."

Research: Marking birds

Wright, Earl G. Marking birds by imping feathers, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D.C. 75 cents a copy), 3(3), July 1939, pp. 238-239, 1 fig.

Feathers of any color can be firmly attached to bases of natural feathers by splicing with metal reinforcement.

Research: Wildlife of unglaciated Ohio

Chapman, Floyd B. The development and utilization of the wildlife resources of unglaciated Ohio, Ohio State University Abstracts of Doctoral Dissertations (Ohio State University Press, Columbus), 28, pp. 55-64, May 1939.

Three years of field research were required to inventory the wildlife, determine land uses, and analyze the ecology of the area. The objectives and methods of the study are briefly outlined in this abstract. Sections are devoted to land use past and present, to wildlife food and cover resources, and to relation of water to wildlife production. Summaries are given of the results of special studies of the gray squirrel, white-tailed deer, and ruffed grouse. Copies of this publication may be obtained from the Ohio Wildlife Research Unit, or the author, Ohio State University, Columbus.

WILDLIFE RESEARCH AND MANAGEMENT LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of the Interior, Washington, D. C.

BS-136. The waterfowl situation: 1938-39, 18 pp., 1 graph, 1 map, 2 tables, May 1939.

Comparison of reports on the volume of the flights in both spring and fall migrations of 1937 and 1938. Summary of field surveys of the flyways and wintering grounds. Results of the annual January inventory. Remarks on bag limits and total kill. The waterfowl population continues to increase.

BS-137. Fall and winter food habits of deer in northeastern Minnesota, by Shaler E. Aldous and Clarence F. Smith, 10 pp., 3 figs., 2 tables, June 1939.

Discussion of the food supply and its utilization with report on 72 stomach analyses. The food items and their frequency of occurrence in stomachs are tabulated. Availability of foods determined by field observations indicates decline in the winter carrying capacity of the range studied. Management to correct the situation is suggested.

BS-138. Sperm studies as a guide in fur-animal breeding practice, by Robert K. Enders, 3 pp., June 1939.

Description of equipment and methods used and interpretation of the findings. The practice may be used to reduce the number of failures to impregnate.

BS-140. A survey of the annual fur catch of the United States, 19 pp., June 1939.

Catch for 1934-38 as reported by conservation departments of 27 States; also assembled by species for the year 1937-38.

SPECIAL ARTICLE

Annual plants of outstanding value to wildlife

During preparation of a manuscript on Plants Useful in Upland Wildlife Management, certain experienced field investigators were asked to contribute notes on the value of annual plants often classed as weeds. The information they furnished has been summarized in the manuscript but as fuller transcription of it probably will be of interest and value to readers of WILDLIFE REVIEW, essential parts of the replies [slightly edited] are herewith reproduced. In a few instances remarks are included on plants that are neither annuals nor weeds.

* * *

Spartanburg, S. C.
November 13, 1937.

"I recognize the difficulty which is encountered when plant species commonly known as weeds are recommended for wildlife food. Nevertheless, these so-called weeds apparently provide a major portion of the foods which our song birds and game birds use. They have added importance if we recognize that these weeds are the plants best adapted to the extremes of climate and of land use (or abuse) in each locality.

"When I recall the great protection such plants have given during the drought years on the Great Plains when nothing else would have survived and erosion would have been much more severe, it pleases me even more to analyze the proper value of such plants and find another reason to feel more kindly toward them. I am satisfied that a dependable supply of food for many species of birds would not be available in Oklahoma except for the species which I list:

Short ragweed	Ambrosia elatior
Western ragweed	" psilostachya*
Prostrate amaranth	Amaranthus blitoides
Spiny amaranth	" spinosus
Bighead doveweed	Croton capitatus
Texas doveweed	" texensis
Snow-on-the-mountain	Dicrophyllum marginatum
Hairy paspalum	Paspalum stramineum*

"My experience with Phlox drummondii has been with quail in our cultivated gardens which a resident covey visited daily to eat the maturing seeds and almost scratched the bed out.

"I have come to the conclusion that crotons as a class are of particular value because they are seldom if ever eaten by livestock, which, of course, is of great importance in a grain and livestock country. Our doves in Oklahoma seem to prefer Croton texensis and Amaranthus blitoides to the newly ripened grain sorghums with which they are intermingled.

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* Perennial

"I have found lambsquarters (Chenopodium album) eaten in limited quantities. Our studies in the Southeast are reflecting considerable credit on Croton capitatus, Croton glandulosus, spurge (Chamaesyce proslii), and bullgrass (Paspalum boscianum), all of which have some value as cover crops in cultivated areas. They are, I believe, of little danger to growing crops but should be recognized as vegetative protection against soil erosion and for production of food for wildlife.

"In the Northern Great Plains, the Dakotas particularly, we should not overlook the value of the bristle grasses (Setaria spp.) which furnish a large amount of food for pheasants and possibly song birds in addition to ground protection where it comes into cultivated corn late in the season.

"Of course, you will include the common sunflower (Helianthus annuus)--an A-1 food for doves, quail, etc. I think you are quite right in mentioning such important annual foods when you write of upland wildlife management."

Verne E. Davison.

* * *

Tucson, Arizona
February 15, 1938.

"It is my feeling that in evaluating the various types of foods composing the diets of game birds, too little attention is commonly given to annual plants; particularly is this true in considering their relation to gallinaceous birds of the semi-desert. If our present data are sound it seems to me the value of such plants may often equal and sometimes exceed that of perennials.

"Some three hundred plant and animal species are now recorded from the stomachs of Gambel's quails--about equally divided between plant and animal items. The exact figures are not readily available, but it is known that the volume of annual plant foods greatly exceeds that of insect matter although second in quantity to perennial plant foods. Of the most important annuals the large volume consumed may be of less significance than the frequency and time of their consumption. Among these are numbered alfileria (Erodium cicutarium), carpetweed (Mollugo verticillata), tansymustard (Sophia monziesii), Boerhaavia watsoni, Lotus trispermus, and some of the grasses.

"It appears evident that the sex-stimulating, fertility-producing, and other vitamins necessary to the welfare of wild quail are obtained from these annuals. If these are not available at certain seasons, the quails' natural functions are thrown out of balance. I have noticed that following winters of little rainfall, with the resultant small or retarded production of winter annuals, the nesting season of quail is unsatisfactory. This may be manifested by an unduly large number of unmated birds, the laying of infertile eggs, an impaired hatchability of eggs laid, or a much retarded and shortened nesting season. Seemingly many of the poor quail hatches commonly attributed to drought are the result of a dearth of green plant food during the preceding winter, and are not caused by arid conditions prevailing at the moment.

"It is significant that the best quail ranges in the Southwest are those which produce the greatest numbers and varieties of annuals; conversely, devastated quail ranges are marked by the absence of these plants."

D. M. Gorsuch

* * *

College Station, Texas
November 18, 1937.

"Although the analysis, according to approved Biological Survey methods, of more than 2,000 crops of bob-white, scaled, and Gambel's quails is virtually completed, the data have not, as yet, been summarized. By subordinating all other activities, however, I have checked the records on 1,000 bob-white stomac for Croton, Dicrophyllum, and other species in which you are especially interested. The stomach contents summarized were collected during December 1934 and January 1935; they came from every major ecological type in Texas.

"The records indicate that the twelve most important winter foods of Texas quail, on the basis of frequency of occurrence and gross quantity consume are as follows:

1. Croton (especially C. capitatus, C. monanthogynus, and C. punctatus*).
2. Panicum (especially P. texanum, P. fasciculatum, and P. capillare).
3. Holcus (H. halepensis*).
4. Quercus (especially Q. nigra*, Q. virginiana*, Q. stellata*, and Q. rubra*).
5. Paspalum (especially P. stramineum*).
6. Ambrosia (especially A. psilostachya*, A. artemisiaefolia, A. apter and A. trifida).
7. Prosopis (chiefly P. glandulosa*).
8. Helianthus (especially H. annuus).
9. Dicrophyllum (D. bicolor and D. marginatum)
10. Chamaecrista (especially C. procumbens and C. fasciculata).
11. Bumelia (especially B. lanuginosa* and B. angustifolia*).
12. Ximenisia (X. encelioides).

"Spurges are the basic winter diet of Texas bob-whites. Croton capitat ranks first in the eastern pine belt, in the coastal section west to about the Nueces River, and in the oak woodlands of central and northern Texas. Croton punctatus has a similar status in the brush country of the Southwest. Croton monanthogynus and Dicrophyllum (D. bicolor and D. marginatum) are among the first five ranking species in the blacklands of central Texas and elsewhere in bottomlands or areas of tight or heavy soil. Other crotons (C. argyranthemus, C. glandulosus, C. texensis, and C. neo-mexicanus) and other spurges (Acalypha Chamaesyce, Tragia*, Stillingia, Jatropha*, and Poinsettia), are also readily eaten. In winter it appears that bob-whites consume more croton seeds than th do of all trees and shrubs combined.

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* Perennial

"The seeds of Mexican clover (Richardia scabra and R. brasiliensis) are especially common in quail crops from the Rio Grande section (Brooks and Kleberg Counties). They have appeared also in material from McLennan and other counties to the east, however, and this plant is doubtless of considerable importance throughout regions of sandy soil.

"Croton capitatus and Ambrosia psilostachya were the two food species which responded best to strip plowing on the quail experimental areas at College Station, Texas, in 1936 and 1937. Also important were buffalo-bur (Solanum rostratum) and horsenettle (Solanum sp.).

"The ragweeds (Ambrosia), ranking sixth in importance throughout the State, include two especially valuable species; namely, giant ragweed (Ambrosia aptera) and perennial ragweed (A. psilostachya).

"Ambrosia aptera, which thrives best in rich soil bordering creeks and branches, furnishes considerable cover as well as food. Because of its dual utility, giant ragweed is considered to be one of the major reasons why the bulk of the bob-white population of central Texas winters along drainage ways. Perennial ragweed is also valuable from both the cover and food standpoints, especially in regions of sandy soil. This low, bushy plant holds its foliage well into winter and is largely unpalatable to cattle. Consequently, perennial ragweed is heavily utilized by quail and by Attwater's prairie chickens as well for shade in summer and for food and cover in winter.

"Seeds of pigweed (mainly Amaranthus albus, A. blitoides, A. palmeri, and A. retroflexus) are a common food of Texas quail, having appeared in quantity in crops from Live Oak, Medina, McLennan, Austin, Washington, Lavaca, Crane, Winkler, Reagan, Kennedy, Dawson and other counties. Because Amaranthus is relatively more abundant in western Texas than in eastern Texas, however, it is of greatest importance as a food of the 'Cotton Top' or scaled quail.

"Aside from Croton, Dicrophyllum, and Ambrosia, other plants that the agriculturalist often does not desire are: the broomweeds (Amphiachyris and Gutierrezia), camphor weed (Heterotheca subaxillaris), Johnson grass (Holcus halepensis*), marsh-elder (Iva ciliata and I. angustifolia), pigweed (Amaranthus), thistle or tumbleweed (Salsola kali), blueweed (Ximenesia encelioides), sunflower (Helianthus), wild indigo (Baptisia*), queen root (Stillingia), bullnettle (Jatropha*), marestail (Leptilon), worm seed (Chenopodium), and nightshade (Solanum*). All of these plants, however, are extremely important as winter food and cover for quail. Their presence, in abundance, in cultivated areas is usually a sign either of slovenly agriculture or exhausted soil. In pastures, their presence, in quantity, is almost invariably a result--and not a cause--of overgrazing. Under such conditions, it is usually better that the land is producing such weeds, which are valuable to wildlife and of some service from a soil conservation standpoint, than it would be if the land were producing nothing at all.

"In many areas in Texas the so-called noxious weeds, especially Croton, Dicrophyllum, Iva, Ambrosia, Amphiachyris, and Gutierrezia, enable quail to persist in goodly numbers where the birds would otherwise be absent or very scarce.

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* Perennial

In some situations the so-called noxious weeds do much to save the top soil as well as the wildlife. Their values in these respects should not go unrecognized. In fact, it is entirely possible and very probable that many areas in Texas would serve their greatest usefulness producing maximum crops of weeds and wildlife."

Valgene W. Lehmann

* * *

Thomasville, Ga.
November 11, 1937.

"Richardia. R. scabra is a very abundant weed in cultivated lands over much of the deep Southeast, where it is usually known as 'Mexican clover' or 'pursley'. This plant furnishes excellent green (summer) food for deer, wild turkey, and quail. We have used it extensively as a green feed in artificial quail propagating, feeding it chopped up and otherwise. We commonly disk (and sometimes fertilize, to produce a more tender, succulent growth) well-seeded fields at intervals of three weeks or so for the volunteer growth. Then this ground is used as a rearing field, and the movable 'growing pens' shifted about on it. While the seed is frequently eaten by quail, it does not seem to be a preferred food, and we believe it to be of low nutritional value, as young quail in earthen-bottomed pens that get the habit of 'mining' this seed, and the seed of the equally abundant buttonweed (Diodia teres) degenerate into 'runts'.

"Florida beggarweed (Meibomia purpurascens). Deer are extremely fond of the growing plant, and frequently make it difficult to produce for quail. The abundant seed furnishes one of the preferred bob-white foods of winter and early spring, and it is extensively planted on the southeastern quail preserves for game feed. The species is also a good hay and cover crop plant but is adapted only to the coastal plain of the deep South. It is the only member of this genus (most of which are perennial, and have been experimented with to a lesser extent) so far used on a large scale, and the only one the seed of which can commonly be purchased on the market.

"Panicum. The panic-grasses as a group (we do not know much about their comparative values) seem to be of outstanding value to the quail and wild turkey. This is especially true of the species which ripen their seed in late winter and spring, before other grass and weed seeds become available. Some that remain green all winter furnish a preferred green food of the wild turkey over its southeastern range. I have long suspected that such green food may be a deciding factor in the abundance of quail under truly natural conditions, and that a sufficiency of early panicums may be the reason that quail occasionally reproduce plentifully in regions distant from agriculture.

"The so-called browntop millet (identified as Panicum adspersum, but we are beginning to suspect that this may be incorrect) has become one of the most, if not the most, valuable plants utilized on southeastern quail preserves for early feed. It matures an abundant seed crop in six weeks or less, produces well on a wide variety of soils, and the seed is greatly relished by quail, wild turkey, and doves; it is now extensively planted for all of these species. It seems likely that 'Texas millet' (Panicum texanum) may be as valuable in the Southwest for these purposes as 'browntop millet' is in the Southeast. But on

experiments indicate that the 'Texas millet' is not particularly valuable under southeastern conditions, as the seed does not fill well at times. It also requires a long growing season, so is not valuable for early food.

"Paspalum. While seeds of several species of paspalum are extensively utilized as late summer and fall feed of quail, the outstanding member of the group here seems to be P. boscianum, which ranks very high as a food-producing plant for the quail, dove, and wild turkey, as well as for a host of finches. It is commonly known as 'bullgrass' or 'watergrass' and grows luxuriantly in rich low ground in corn and other cultivated fields, where it is considered a pest by most farmers. We sometimes plant seed-impregnated ground where we desire to get it started, and it is perpetuated by spring disking. Sometimes it is necessary to fertilize as well as disk on unfavorable upland soils. While the seed can be easily gathered, we have been unable to get dry-stored seed to germinate, and believe that it requires special storage methods. Our first step in bringing in 'bullgrass' on farmed-out soils of quail preserves is to raise the fertility of the ground by the planting of cover crops for nitrogen fixation and humus. As the soils improve in condition 'bullgrass' usually comes in abundantly.

"Partridge peas (Chamaecrista fasciculata and C. nictitans) are of outstanding value to quail over the southeastern coastal plain, the seeds of both furnishing a high percentage of the winter food in many localities. Should be called 'fire weeds' here, as they thrive and seed heavily in old fields and open pinelands that are frequently burned over in mid-spring (March in the deep South), but disappear where pine straw and dead grasses are allowed to accumulate. To produce them in the vast quantity desired on the quail preserve, great care must be used to burn at just the right season. If burned too early the seed may germinate wholesale, only to be completely killed off by late freezes. They can be produced abundantly also in fallow fields by rotation with a row crop like corn--one year in a crop and two to three years fallow. Fire and rotation of crops are the only practicable methods known of maintaining partridge peas in maximum abundance, though disking helps greatly at times and under certain conditions, not yet thoroughly understood. The seed is very difficult and expensive to gather, due to the fact that the pods ripen irregularly and shatter as soon as dry. Some are shattering while the plant is still blossoming.

"Sesbania. S. macrocarpa is now coming into wide use on southeastern quail preserves, as the abundant seeds are valuable to quail throughout the entire winter and spring, once a taste for them has been acquired. The plant grows naturally around the margins of lakes and ponds and on rich low fields. It may become a pest in rice fields, and volunteers heavily in corn on lands of the rich delta type. On upland soils not naturally adapted to its culture, it must be row-planted, fertilized, and often cultivated. It can be perpetuated on well-adapted soils by disking in early spring.

"Ragweed. In the writer's opinion, the short ragweed (Ambrosia elatior) is probably the most valuable single species of plant in the eastern United States to the bob-white and many other seed-eating species. Its disappearance would undoubtedly be a limiting factor of vital importance to seed-eaters were the eradication campaigns waged against it successful, which now seems unlikely. In the north it is one of the few abundant and widely distributed seed-producers

that project above the snow and furnish food at critical times to seed-eating birds, including quail. In the South it is most extensively used by quail from September to January, when the birds normally go on to legumes. It is sometimes produced especially for quail on southeastern quail preserves by disking well-seeded ground in late fall and early winter. Some tobacco-growing experiments indicate that it may have a vitally important place in soil conditioning.

"Several species of the native perennial lespedezas, meibomias, and others of this class, and a great many annual legumes are fine prospects for quail preserve use, but much more experimentation will be necessary to demonstrate their comparative values. Many have been experimented with and are heavily utilized by quail, but the question of whether to use them or not is one largely of practicability. For instance, why gather the seed and culture a native perennial lespedeza when an exotic like Lespedeza sericea may prove much cheaper and more satisfactory on a large scale, and the seed takes the place of that of the whole native group, as frequently seems to be the case?

"We have disked rather extensively in early spring and summer for chocolate weed (Riedlea corchorifolia) on the low rich soils of certain South Carolina places, for quail and dove feed, but we only do so where the soils are seeded and especially adapted for it. This is determined by examination of the ground. If it grows luxuriantly in a hog rooting or other disturbed spot, we know the ground is both seeded and adapted, and act accordingly. Otherwise the land may continue for years to grow nothing but an inferior group of plants of little food value to game.

"This principle is utilized in disking for ragweed, beggarweed, sesbania and many others. We also find that some plants grow on hard, compact soils but poorly, and are stimulated greatly by an occasional disking of the soils. Game managers must become students of the soils and become experts in the production of many of the most important foods by cheap cultural methods, just as livestock pasture men must do. And the only way they will ever do it is to get some land and go to work on it. I am losing patience with many of the younger generation of scientific game students who think they are getting somewhere by research without getting their fingers dirty.

"I personally do not find that we must work with a very large group of plants in any one region for quail and turkey production. We have only to produce a lot of each important class of food for the various seasons; the game will balance their food themselves by drawing from a variety of native species normally growing on lands adapted to game. For instance, we may plant one early panicum ('browntop millet') to supplement the native group, one perennial lespedeza (L. sericea), where it is needed, and so on down the list. It is usually a sign of the amateur to plant a great variety, at much expense, for upland game birds; the skilled professional is known by his limited, but vitally important, list and the food that he gets by cheap and efficient cultural methods without planting at all."

Herbert L. Stoddard

* * *

San Francisco, Calif.
January 18, 1938.

"Medicago hispida. The bur-clover is important to seed-eating birds and mammals nearly throughout the year. The California quail consumes this plant more extensively than it does any other single food species in many parts of California. The plant is considered an excellent source of forage by stockmen. The green leaves are important to both stock and wildlife during spring and summer while the burs are heavily utilized during the fall and winter months. The seed is available from commercial seed houses.

"Lupinus (all species). The seeds are important as food for small birds, including quail, and for seed-eating mammals. The plant is of some value as a soil-binder in preventing erosion. However, it should not be grazed by live stock during the summer and fall months because the seeds are toxic, especially to sheep.

"Trifolium (all species). The seeds and leaves of clovers are of high food value to wildlife. The plants are also of undoubted value as forage for livestock as well as being of use in fixing nitrogen in the soil.

"Lotus americanus (and other native species). As in the case of most other legumes, the seeds and leaves of Lotus americanus and others of the genus are highly nutritious and eagerly sought by wildlife. These species probably tend to enrich the pasture lands where they occur by providing a leguminous element in a forage type wherein the grasses usually dominate.

"Melilotus indica. Some doubt has been cast on the value of the Melilotus group to wildlife by Errington's findings with regard to M. alba as a food for the bob-white. However, the writer has observed California quail and their young feeding voluntarily and extensively upon M. indica over a period of several months with, apparently, beneficial results. The seed is available commercially.

"Erodium cicutarium. The value of alfilaria to wildlife seems to be second only to Medicago hispida. The leaves are an important source of food during spring and early summer while the seeds are heavily used in fall and winter. Tests by agricultural experiment stations have demonstrated that this plant is almost as valuable as Medicago hispida for grazing purposes.

"Brassica. The mustards occasionally grow very densely on fallow lands and are then of some value as cover. Whether the seed is of value to any important species of wildlife other than rodents I cannot say positively but what little evidence I have is negative. At least it seems doubtful that quail benefit significantly by these thick mustard stands except to the extent that protective cover is thereby available. On the other hand the mustards are considered rather undesirable weeds by stockmen.

"Eremocarpus setigerus. The seeds of turkey mullein are well liked by quail and doubtless by other wildlife. However, in my experience it occurs mostly on soils which are arid and impoverished either naturally or through overgrazing."

E. Lowell Sumner, Jr.

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Urbana, Ill.
May 10, 1938.

"Recent studies of the food habits of the Hungarian partridge (Perdix perdix) show that adult birds feed mainly on vegetable matter at all seasons. Although young birds eat large amounts of animal matter, chiefly insects, during the first few weeks of life, by late summer they have adopted a diet largely of seeds, grains, and succulent vegetation similar to that of adults.

"During a life history study of the Hungarian partridge in southern Michigan and northern Ohio, the writer made regular observations on feeding habits and collected for study a series of 53 stomachs over a period of about twenty-one months from November 1929 to July 1931 (4). The principal food classes according to a volumetric analysis of stomach contents made by the Food Habits Division of the Bureau of Biological Survey were as follows: Cultivated grains, 42 percent; wild seeds, 26 percent; leaves of grain, grass, and other succulent plant material, 25 percent; animal matter, chiefly insects, 7 percent. Inasmuch as the stomach samples were collected for the most part in a grain growing section, the high total of cultivated grains is largely attributable to the general abundance of waste and unharvested grain, chiefly corn, in this region during the fall and winter months. In general farming sections, observations indicate that the proportion of weed seeds consumed is often considerably higher than indicated above. It is of interest to note that Middleton and Chitty (3) in England found weed seeds and grains approximately in equal amounts in a series of 429 partridge crops collected during all seasons.

"Among wild seeds, four kinds totaling 19 percent of the stomach contents appear to be of especial value as partridge food in the Michigan and Ohio range. These are briefly discussed below.

"Lesser ragweed (Ambrosia artemisiifolia). Ragweed seeds were present in 29, or 55 percent of, partridge stomachs examined and constituted approximately 7 percent of the total volume of food. Although ragweed seeds were eaten from September until April in this region, they were taken in quantity only from November to late February. Since many of the seeds are retained on the plants until past mid-winter, ragweed is usually particularly important as a source of food during December and January snows when many of the other seeds become unavailable. Although ragweed seeds ranked below corn, which constituted 22 percent of the food for the year, and barley, 11 percent, it is evident from field observations that these seeds frequently constitute the chief item of food of certain coveys for considerable periods of time. Wide distribution of ragweeds in this region is favorable to the partridge since this bird, like the bob-white, has a relatively restricted cruising range.

"Green foxtail (Chaetochloa viridis) and yellow foxtail (C. glauca). Seeds of the green foxtail occurred in 13, or 25 percent, of the stomach samples. They were eaten chiefly from September to November, although a few seeds were found in stomachs of birds collected in the spring. Yellow foxtail seeds were present in 10, or 19 percent, of the samples and were eaten from August to November. Seeds of the two foxtails totaled about 10 percent of all food eaten. Yellow foxtail seeds begin to mature early in August before many wild seeds have become available and are sought eagerly by young and adult birds. Since seeds of the yellow foxtail shatter early, they are found in the fall food less fre-

quently than are those of the green foxtail, which ripens a little later and holds its seeds during a longer period.

"Black bindweed (Polygonum convolvulus). Black bindweed occurred in 19 percent of all stomachs and was present in the food from October until February. The seeds are nearly as large as those of ragweed and apparently are taken readily by the partridge wherever they occur. Lack of general abundance of bindweed in this region probably chiefly accounts for the fact that it made up only 2 percent of the food. Kelso (2) reports that black bindweed seed comprised 11 percent of the contents of 96 partridge stomachs collected during fall and winter months in the State of Washington. He found it the chief food item among wild seeds.

"About 20 other seeds, chiefly those of common weeds, constituted approximately 7 percent of the diet of partridges in the Michigan and Ohio range. It was found that several of these seeds are eaten with fair regularity, although in small quantities. Observations indicate that this list could be extended considerably. In this group the polygonums appear to be of some importance. These include ladysthumb (P. persicaria), smartweed (P. pennsylvanicum), water smartweed (P. punctatum), and knotweed (P. aviculare). Seeds of these plants apparently are frequently picked up from the ground during open periods in winter. Casual observation indicates that seeds of this genus suffer somewhat less from rodent damage than those of ragweed and foxtail.

"Seeds of pigweed (Chenopodium album) persist on the plants until winter and are eaten by partridges frequently in late fall and early winter.

"Grass seeds, especially the larger ones such as those of barnyard grass (Echinochloa crus-galli), fingergrass (Syntherisma villosa), and crabgrass (S. sanguinalis) are found frequently, although in small quantities. Witchgrass (Panicum sp.) is eaten to some extent. Hicks (1) states that seeds of bluegrass (Poa sp.) also are eaten by the partridge in Ohio.

"Among early ripening seeds of wild annuals taken in mid-summer are those of cleavers (Galium aparine), mouse-ear chickweed (Cerastium vulgatum), and crowfoot (Ranunculus abortivus), as well as some of the composites. It is evident that partridges take a variety of seeds, although the cultivated grains and four wild annuals make up the bulk of the seed diet."

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"1. Hicks, L. E. Food habits of the Hungarian partridge in Ohio. Bul. 24, Bureau of Scientific Research, Ohio Division of Conservation.

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"3. Middleton, A. D., and Helen Chitty. 1937. The food of adult partridges, Perdix perdix and Alectoris rufa, in Great Britain. Journ. Animal Ecol. 6:322-336.

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Ralph E. Yeatter

* * *

NOTES AND NEWS

Apparently a national campaign against ragweed is getting under way. Posters are appearing, one issued by The Garden Club of Wilmington, Delaware, urging readers "to destroy ragweed the cause of hay fever. Pull up by the roots x x x and burn." As in the case of drainage for malarial control, this movement puts wildlife proponents in an embarrassing position, since regardless of natural values involved, they can hardly take a stand that seems opposed to public health. Perhaps the main consolation is that noted by Stoddard on a previous page (p. 43).

A book that does not pertain to any of the subjects regularly noticed in WILDLIFE REVIEW but which may, nevertheless, be of interest to many readers is Robert Snedigar's, "Our Small Native Mammals, Their Habits and Care," 308 p., Illus., 1939 (Random House Inc., 20 East 57th St., New York, N. Y. $2.50 a copy). The work is a well-illustrated volume that treats in popular fashion many kinds of animals, from mammals to earthworms, that are likely to be kept in captivity. Information on suitable enclosures, and on food and care, therefore, is emphasized.

California.--A publication by Aaron Gordon and Arthur W. Sampson, "Composition of Common California Foothill Plants as a Factor in Range Management" (University of California, Agricultural Experiment Station Bul. 627, 95 pp., 24 figs., 12 tables, March 1939) is of interest to wildlife managers for its discussion of variation in nutritive value of plants according to season, site, rainfall, and other factors, for its presentation of analyses of some of the same plants with which they have to work, and for its bibliography of 52 titles of related literature.

New Mexico.--An act providing for the protection of non-predator fur-bearing animals passed by the State legislature in 1939 designates such animals as the "muskrat, mink, weasel, civet cat, masked or blackfooted ferret, ringtail cat, raccoon, pine marten, coati-mundi, badger, and all species of foxes." The law authorizes the State Game Commission to "issue permits at any time for the taking of fur-bearing animals doing damage to game, poultry, or livestock."

Wisconsin.--The Wisconsin Agriculturist and Farmer (Racine, Wis. 5 cents a copy) is publishing a series of short popular articles on wildlife management, mostly by Aldo Leopold. Sample titles are "Wildlife conservation on the farm" (65 (24), Nov. 19, 1938, p. 18); "Bob-white whistles at winter" (65 (25), Dec. 3, 1938, p. 16); "Woodlot wildlife aids" (65 (27), Dec. 31, 1938, p. 4); "The farm pond attracts game" (66 (3), Feb. 11, 1939, p. 7); and "Plant evergreens for bird shelter" (66 (9), May 6, 1939, p. 5).

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WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
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BY THE
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Washington, D. C. No. 25 October, 1939

The Transactions of the Fourth North American Wildlife Conference, a paper-bound volume of ix+644 pages, published in September 1939, may be obtained from the American Wildlife Institute, Investment Building, Washington, D. C., for $1.00 a copy, postpaid.

Conservation: General

Lloyd, Hoyes, and Ira N. Gabrielson. A continental review of the wildlife resource, pp. 75-86.

Lloyd. To protect fur animals in Canada, reserves are established where only natives may trap. The total area of these reservations is 584,000 square miles. Under protection, musk oxen are beginning to increase. The introduced reindeer are thriving and their presence will relieve pressure upon caribous. Restoration by a number of agencies of water areas beneficial to wild fowl and fur bearers is in progress, and bird sanctuaries are being added. Hand-rearing of waterfowl to supplement the wild supply is being attempted. The eider-down industry gives people a personal interest in conservation of eider ducks that is more effective than police protection. In general, 1938 saw increase in the number of waterfowl over the greater part of Canada.

Gabrielson. Comment on increased interest in wildlife, in personnel trained in wildlife management, and in the volume of research. States are showing an increased tendency to apply the results of technical investigations. Management is being more widely adopted. Waterfowl are increasing and the Federal refuges are contributing greatly to protection of the birds. Their importance in producing wild fowl also is rapidly growing. The cooperation of State representatives working out a constructive program of wild fowl restoration is acknowledged. The number of hunters is growing rapidly, hence restrictions on the kill are, and will continue to be, necessary. Federal wildlife refuges of all types under administration by the Biological Survey number about 250, embracing some 13,500,000 acres. Recent additions have been for the benefit of the great white heron, the white-crowned pigeon, and the desert bighorn. Lands transferred from the acquisitions of the Rural Resettlement Administration are enabling the Survey to protect additional forms of wildlife. The Agricultural Adjustment Administration has for the first time included among reimbursable practices, specific provisions for the benefit of wildlife. The Federal aid to the States program of wildlife restoration got rapidly under way and is very promising.

Cycles: Grouse, Ruffed

Bump, Gardiner. Some characteristics of the periodic fluctuations in abundance of ruffed grouse, pp. 478-484, 2 figs., 1 table.

Analysis of 1,500 records of grouse abundance gathered by the New York State Ruffed Grouse Investigation. Prevailing information and impressions respecting cycles are sketched. There is proof of a period of scarcity following abundance more than 100 years ago. The evidence for periodicity in numbers is discussed and charted; it is not entirely unequivocal but may, perhaps, be regarded as indicating cycles modified by type of cover, regional lag, and

other factors. Behavior of the grouse population of the Connecticut Hill area near Ithaca during 3 phases of the cycle is briefly noted. The primary cycle is often obscured by local fluctuations of independent causation.

Destruction: Habitat by hurricane

Griffith, Richard E. Effect of the 1938 hurricane on waterfowl areas on the North Atlantic Coast, pp. 406-410.

Characteristics of the storm and of the tidal wave it engendered. This covered some marshes by washing sand over them, the receding waters scoured shallow flats carrying off large quantities of duck foods, and the cutting of new, and enlarging of old, inlets increased the salinity of waters along the south shore of Long Island. Freer flow of the tide may compensate in part for the drainage effects of ditches in the salt marshes. The sand deposits obliterated many beds of waterfowl food plants but doubtless enough seed stock remains to replace them in a few years. The scouring action was beneficial in removing sludge inimical to the production of wild duck foods and harmful in depleting the existing supply. Bad effects of increased salinity probably will be temporary. There was wholesale destruction of trees and shrubs along much shore line and even far inland. Suggestions are made as to what management may do to repair the damage wrought by the 1938 storm and to minimize that from possible future hurricanes.

Diseases and Parasites: Botulism

Coburn, Don R., and E. R. Quortrup. Recent findings in relation to the control of botulism in waterfowl, pp. 359-363.

Under optimum conditions either flooding or draining can achieve control. Conditions often are not perfect, however, and reliance must not be placed on methods heretofore considered generally valuable. Unqualified persons have suggested remedies that have seriously objectionable features.

Authors' summary: "With knowledge that the decomposition products of numerous kinds of marsh vegetation inhibit the growth of Clostridium botulinum and neutralize preformed toxins, new and valuable weapons are placed in the hands of those concerned with the management of wildfowl areas. Suggestions for management include, in addition to flooding and draining already in vogue, the use of vegetation for the production of beneficial decomposition products, for windbreaks, for repellents to discourage the use of danger areas, and for food patches to attract birds to safe waters. A wide variety of emergent, surface, and submerged plants are available for these purposes. Indirect control of water as affected by wind action may be maintained by plantings, making artificial islands, and by providing deep canals for water return. Direct control through a system of dikes and canals is recommended where other methods do not avail. Properly built and located artificial islands will serve as resting grounds attracting waterfowl away from dangerous shallows and mud flats. Algal growths of the Cladophora group are potentially dangerous as producers of culture media and anaerobic conditions. The known role of animal flesh remains,

as favorable incubators of botulinus organisms, makes safe disposal of this material necessary. Until further trials of disinfectants are made under field conditions their use cannot be recommended."

Diseases and Parasites: Deer, White-tailed

Whitlock, S. C. The prevalence of disease and parasites in whitetail deer, pp. 244-249.

Review of the subject (giving 8 bibliographical citations) with special reference to the deer of Michigan. Running comment upon numerous parasites including notes on their occurrence, abundance, and importance. The white-tailed deer, given a satisfactory food supply, appears to be well-equipped physically to resist the various maladies to which they are susceptible. Winter food is a more serious limiting factor but something can be done about that. The species thus appears to be quite amenable to management.

Ecology: Census methods

Ruff, Frederick J. Region 8 technique of wildlife inventory, pp. 542-545.

Game drives are expensive (22 cents per acre) and impracticable in rugge country. Strip censusing is far more economical, can be applied almost anywhere, and gives satisfactory results. Counting deer or their tracks along roads from automobiles are convenient supplementary methods that soon yield more data than pedestrian tactics. These plans and modifications to improve them are being tested. The success achieved in regulated hunting, live-trapping and farm-catching also is indicative of population numbers, and figures representing it can be used to compute absolute numbers when applied to suitable estimates of relative abundance. Reliable periodic estimates permit satisfactory formulation of management plans.

Ecology: Census methods, pheasant

Randall, Pierce E., and Logan J. Bennett. Censusing ringneck pheasants in Pennsylvania, pp. 431-436, 7 tables.

Application of the method developed in Iowa by Bennett and Hendrickson to Pennsylvania. Occurrence and pertinent habits of the birds are described and counts in different areas tabulated.

Authors' summary: "(1) The Iowa pheasant census technique is applicable to areas studied in southeastern Pennsylvania and seems to have possibilities for large-scale application in pheasant ranges; (2) the cost of such a census is very low, and the method appears to be much more accurate than any other method yet devised for large areas; (3) roadside counts should be made from an automobile traveling 15 to 20 miles an hour over gravel or dirt roads; (4) the time to make counts is from sunrise to one and one-half hours later. They should be made on clear fall days having normal dew-fall. Rainy, foggy, cloudy and dewless mornings are not satisfactory times; (5) six to eight birds a mile

indicated a population of 1 bird to 2 acres. Two to three birds a mile indicated 1 bird to 4 acres. Seven-tenths to 1.82 birds a mile indicated 1 bird to 6 or 7 acres. Twenty-five hundredths to 0.60 bird a mile indicated 1 bird to 18 or 20 acres; (6) the largest ringneck pheasant populations were in those areas that had the largest acreage planted in corn."

Ecology: Drainage operations

Bourn, Warren S., and Clarence Cottam. The effect of lowering water levels on marsh wildlife, pp. 343-350.

Classification of marshes and description of their principal plant associations. Water level is usually the dominant ecological factor and altering it may have far reaching effects on both flora and fauna. Plants may be replaced by others less valuable to wildlife and drainage, lowering the water level only a few inches, may bring about great reduction in invertebrate populations so important as a food resource for vertebrates. Examples are given for 4 plant associations, the reduction by percentage ranging from 43.5 to 92.6.

Ecology: Land-use in relation to pheasant production

Leedy, Daniel L. Some land-use factors related to pheasant production, pp. 525-533, 1 table.

Author's summary: "(1) The various methods used in harvesting corn, soybeans, and small grains in Ohio are discussed in relation to pheasant production; (2) the present trends in harvesting methods are in general beneficial to pheasant production. Surveys in 4 counties indicated that in 1936, 7.9 per cent of the corn was picked, 23.0 per cent in 1937, and 38.0 per cent in 1938, making increased quantities of waste grain available for wildlife; (3) less than 15 per cent of the picked corn in Wood County is pastured--a favorable practice--and 42.1 per cent of the pastured cornfields observed were partially or entirely enclosed by electric fences--an unfavorable one. Less than 20 per cent of the mechanically picked corn was repicked by hand, thus leaving waste grain in most of the fields; (4) the pheasants on one Wood County refuge consumed about 186 bushels of corn obtained in cornfields during a four-month period following the hunting season in 1937; more than 91 per cent of this was waste; (5) wheat is an important source of food of Ohio pheasants and the high stubble left by combines furnishes ideal cover. Wheat stubblefields are utilized twelve times as much as oat stubblefields for pheasant roosting sites; (6) surveys made in thirteen fields of soybeans, combine harvested, indicated that there was an average waste of 3.79 bushels per acre in 1938; (7) smartweed seeds are valuable pheasant food and an average of 48.3 pounds of smartweed seeds were found per acre in four cornfields; (8) ragweeds produced 85.90 pounds of seed per acre in fifteen wheat stubblefields sampled, and 5 pounds per acre in eight oat stubblefields; (9) the methods used in calculating the amount of weed seed produced per acre are described; (10) the practice of clipping small grain stubblefields, as a ragweed control measure, is detrimental to pheasants; (11) approximately one-third of the hen pheasants nesting in meadows are killed or crippled during the mowing season; (12) about 20 per cent of the pheasant nests in the non-crop land of Wood County were found along drainage ditches, which furnish valuable food

and cover and serve as travel lanes; (13) some of the shallower ditches are being replaced by tiles, converting waste land ideal for cover into cultivated land." Bibliography of 9 titles.

Ecology: Mosquito control operations

Williams, Louis L., Walter B. Jones, J. Lyell Clarke, Clarence Cottam, and Warren S. Bourn. Need mosquito control be incompatible with wildlife?, pp. 114-136.

Williams. Only one species of Anopheles (A. quadrimaculatus) is important as a vector of malaria. Its habits are such that it is favored by impoundments of water flooding brushy areas. There food is abundant and enemi few. Dense swamps are unfavorable but partly logged-off swamps are good breed ing places. Pioneer land uses created malaria hazards. "In the era of major drainage ending about 20 years ago, the malarious area was reduced about one-half; in the impounded water age, in which we now live, the malarious area is increasing." Most of the Southern States have adopted regulations for malaria mosquito control in impoundments. The top minnow is not so important in controlling anopheline reproduction as widely believed; wave action on clean shor lines is much more useful. Fluctuation of the water level is another and some times very successful means of control. Where it cannot be properly employed, treatment with larvicides is necessary. Complete biological control at a reasonable cost is something yet to be devised.

Jones. Drainage destroys habitat without which certain animals cannot live. An even worse effect is lowering of the water table. Oil treatment kills top minnows which, in biologically balanced waters, contribute to an association that controls mosquitos. Fluctuating water levels and applying sodium arsenate destroy vegetation, essential to wild ducks and fishes. Pres mosquito control practices are entirely destructive, not at all constructive. Ten recommendations for improvement in the program are: "(1) That the health authorities confine their principal activities to areas of concentrated popul tion; (2) that they provide biological control for sparsely populated areas; (3) that they use preventive medicines to reduce or destroy malaria in man; (that they emphasize research in preventive medicines; (5) that the money now wasted on ineffective control be used for the screening of houses in infected areas to reduce the spread of the disease; (6) that drainage be abandoned or minimized and wherever possible impoundment substituted therefor and biologic control be provided in all such areas; (7) that deliberate fluctuation of th pool levels in impoundments be abandoned as totally destructive; (8) that sui able food plants be provided for duck and fish life; (9) that all health programs be coordinated with biological and wildlife interests; (10) that around all habitations, all receptacles capable of holding water be destroyed, treat or covered."

Cottam and Bourn. There can be no opposition to the principle of control but wildlife conservationists seriously object to excessive control and methods unnecessarily destructive to wildlife or its habitat. Mosquito contr can be coordinated with wildlife conservation if done only where needed, kept to a reasonable minimum, carried out under competent supervision according to

plans giving biological factors due weight, characterized by preferential use of the least destructive methods, and balanced by creation of new wildlife habitat to compensate for any necessarily destroyed. Examples of coordinated campaigns are cited from Illinois and Rhode Island. Control of water levels is preferable to drainage; suggestions are given for the treatment of coastal marshes and ponds. Ditching has been excessive and maintenance failing, as seems unavoidable, mosquito hazards are increased. Moreover the campaign appears to have reduced neither the number of cases of malaria nor the death rate in the Southern States. Greater emphasis should be placed on therapeutic control of malaria, some types of which appear to be satisfactory. The message of this contribution is summarized in 8 short paragraphs.

Clarke. In response to public demand, mosquito control operations have changed from those done without thought of environmental values to others that will preserve scenic amenities and balanced ecology, the latter a necessity for control. The habits of mosquitos in 3 seasonal groups are discussed with relation to control measures, among which those not destructive to wildlife or its habitat are favored. Intermittent marshes provided with a deep central pond and radiating ditches will conserve mosquito predators that will spread through the area with rising water levels and consume the mosquito larvae. Biological methods of control are urged and examples cited. Pyrethrum larvicide, harmless to wildlife, is more destructive to mosquito larvae than are the objectionable oils. Mosquitos transmit diseases of wildlife as well as those of humans in number that seems steadily to increase. "If we would protect the natural habitats of wildlife, let us be ready with reasonable and effective mosquito control methods, for the public certainly will not stop to consider wildlife when the ravages of some terrifying disease is upon them."

Ecology: Nesting success

Kalmbach, E. R. Nesting success: Its significance in waterfowl reproduction, pp. 591-604, 5 tables.

Nesting success of numerous species as recorded in the literature, of which 56 titles are cited, discussion of losses by groups of birds, and of the causes, incorporating throughout the writer's field experiences.

Author's summary: "To appraise the significance of egg loss among waterfowl, comparisons have been made with similar losses experienced by (1) upland ground-nesters, (2) species that nest above the ground (largely bush- and tree-nesters), and (3) hole-nesting species. An average nest success of 43 per cent was noted among upland ground-nesters as disclosed in 22 separate studies involving 5,600 nests. The average for bush- and tree-nesters was 52 per cent, a fact revealed by the history of more than 670 nests in eleven studies. The hole-nesters were most successful, with a rating of 73 per cent as determined in twelve studies involving more than a thousand nests. In twenty-two field studies of nesting waterfowl, including the histories of more than 7,600 nests of thirteen species, the average degree of nest success was 60 per cent. Had the results from three studies conducted under adverse nesting conditions been omitted, a success rating of 63 per cent would have been recorded. On the basis of abstract hatch, therefore, waterfowl seem to succeed

better than either upland ground-nesters or bush- and tree-nesters, but fall below the standard of the relatively securely housed hole-nesters. On the assumption that 63 per cent success represents the average among waterfowl nesting under varied conditions, and with the knowledge that, under advantageou conditions, much higher survival has been obtained, it has been concluded that 70 per cent success may be looked upon as satisfactory on managed refuges. Th average has already been attained and even exceeded on refuges most advanced i development and management. With that satisfaction also comes the conviction that loss of the complementary 30 per cent is normal, probably inevitable, and apparently inconsequential in the equation that ultimately determines the tota supply of ducks.

As for the suppressive factors, they are many and varied. There may be wide divergence in their character and importance on the different refuges and they may show marked diversity on the same refuge from year to year. With numerous elements exerting an influence on the hatch, rational management call for control of those that investigation has shown to be locally or temporarily most destructive. This policy has particular merit as applied to the handling of predators. It is much to be preferred to the wholesale control of proscrib species everywhere with the expectation that a general benefit will be forth-coming."

Ecology: Openings

Gray, Donald V., and Louis C. Hemmel. A study of game cover and openings in the Buck Creek plantations, Huron National Forest, Michigan, pp. 554-559, 1 map., 6 tables.

Due to failure of planted trees, the plantation selected for study had about the same proportion of openings as an adjacent natural woodland. Detail are given in a map and the tables. An unplanted area about 71 percent open wa included in the survey. It appears that the small game and fur animal popula-tions were not greatly different in the planted and unplanted areas. There we more rabbits and squirrels in an area where slash had been left in piles than where complete disposal had been practiced. The plantation in its present st seems to provide a pattern of openings which could scarcely be improved upon i deliberately planned.

Ecology: Overpopulations

Cliff, Edward P. Relationship between elk and mule deer in the Blue Mountains of Oregon, pp. 560-569, 2 figs., 2 tables.

Greatly reduced by pioneer utilization, deer and elk under protection increased until there were too many of them for their own good. Capacity of the winter range is the limiting factor and in that range the animals often become competitors for food. A table lists the winter foods and indicates the utilization by mule deer and elk. A graph shows increase in these animals on the Whitman National Forest from 1921 to 1938. The mule deer are unable to compete successfully with elk because of physical disadvantages and under com-petition are gradually replaced. A great loss of deer occurred in the winter

of 1931-32; since that time the species has made partial recovery but individuals are of lower average weight. The killing of bull elk has not resulted in keeping the herd within bounds. Mule deer are superior as game animals and about three times as many of them as of elk can be maintained on the same amount of forage. Where the objective is to make more sport they should be favored. Whichever animal is favored, the total population should be kept at all times below the sustained carrying capacity of the range.

Education: Conservation

Ross, W. A., C. W. Warburton, E. Laurence Palmer, Tom Wallace, and Frank E. Mullen. Education, a powerful tool for wildlife restoration, pp. 87-112.

Ross. The conservation attitude is a state of mind that can be encouraged by education. Four principles of education are outlined. A very important one is participation and progress in that respect in the conservation field is illustrated by accomplishments in numerous localities of "Future Farmers"--vocational students in high schools, numbering about 200,000. Plans of the U. S. Office of Education for direct participation in the teaching of conservation are outlined. Present vast expenditures for conservation emphasize the neglect of education in this field without which schooling is incomplete.

Warburton. The U. S. Extension Service attempts to coordinate all findings affecting rural people and to focus them on fundamental local problems. The county land planning committees offer a great opportunity to all interested in land utilization. The Extension Service confidently expects that land-use planning will give wildlife conservation an impetus that will accomplish much within the next few years. The future of wildlife rests so largely with landholders that interesting and instructing them is of paramount importance. Various specialists of the Extension Service participate in the work, and some have been employed specifically for it in Texas, Iowa, and Michigan. Activities in Texas are briefed and accomplishments in numerous localities, especially through 4-H Clubs, are summarized.

Palmer. Education has been a great factor in the advance of agriculture and it can play a similar role in conservation. Agriculture has succeeded so well that limiting production is the watchword; perhaps wildlife management can follow this example. Conservation departments do not yet realize the need and value of spending a reasonable proportion of their funds for education but that realization will and must come. A preliminary review is given of conservation education in the United States, survey of which is under way. The importance of practical education is pointed out and the speaker believes it is suitable for schools of all grades, and not only for those of secondary or higher rank. Several approved publications are named. What agriculture has done by its educational techniques, wildlife can do if it doesn't expect too much in a hurry. "Agriculture has learned how to produce a superabundance in part by means of floods of suitable, local, cheap, printed material coupled with agricultural education centering in trained leaders free to serve strategic areas. It has recognized that the imagination and cooperation of youth is essential and that a functional education coupled with research and an adequate

financial program might well do more than all the laws in the world. I might even venture to predict that a land-owner class enlightened in the value of wildlife, protected in its rights and fairly rewarded for its cooperation would solve so many of the problems of wildlife restoration that laws might be unnecessary and there would be an abundance of wildlife for all groups interested in it and willing to assume a just responsibility in it."

Wallace. The best educative influence that can be brought to bear is that of the daily press and the county weeklies. Authentic material prepared in a way that will help sell papers is needed. A scholarship for training out door writers proposed.

Mullen. Education of youths not adults is most promising. Conservation textbooks unifying the subject are needed. The press is willing to do a hundred times what it is now doing and radio is ready to serve. Appeal to selfish motives is most productive of results.

Food Habits: Grouse, Ruffed

Darrow, Robert. Seasonal food preferences of adult and of young grouse in New York State, pp. 585-590, 1 fig., 4 tables.

Report based on analyses of the contents of the stomachs of 485 adult and 332 young grouse. Results are given for these age groups and for 3 regions of the State, the Adirondack, the Catskill, and the remainder. The ten most important plant foods (genera) are tabulated and discussed as are also seasonal variations in use of these foods and others of lesser rank. Animal foods, of most importance to the chicks, are more briefly annotated.

Food Habits: Nutritional requirements, deer

Davenport, La Verne A. Results of deer feeding experiments at Cusino, Michigan, pp. 268-274, 4 figs.

Progress reports on carrying capacity and controlled feeding experiments. In yarding territory where swamp conifers are the predominant browse, the carrying capacity during years of maximum production is 2-3 deer per acre and in upland hardwoods probably well below one deer per acre. In the controlled feeding tests a considerable variety of foods were given singly or in combinations. The trials were in winter, and with the exception of fawns in 2 experiments, the animals invariably lost weight. The lowest loss when natural food were used was with a combination of 6 kinds of browse--white cedar, hemlock, hard maple, white birch, black ash, and basswood. Stock feeds and browse supplemented by such feeds in most experiments maintained weights better than the natural foods.

Food Habits: Snakes

Uhler, F. M., C. Cottam, and T. E. Clarke. Food of snakes of the George Washington National Forest, Virginia, pp. 605-622, 5 tables.

Brief description of the Forest and of game conditions there. About 900 snakes were collected of which 418 contained sufficient food to warrant tabulation. These represented 15 species, the general, and food, habits of each of which are discussed; for 11 species the findings are tabulated. A very considerable addition to the undesirably low stock of definite information on the food of snakes.

Food Habits: Squirrel, Fox

Baumgartner, Luther L. Foods of the fox squirrel in Ohio, pp. 579-584, 3 tables.

Report upon more than a thousand hours of food habit observations and upon analyses of 78 stomach contents. Those of 63 stomachs averaged 25.2 grams in weight. Vegetable foods are tabulated in the order of their importance, each of the following being given the highest rating: acorns, nuts of hickory and beech, and seeds and buds of maple and elm. The animal food (of little importance) also is tabulated. Foods are classed and discussed as staple, emergency, and auxiliary and listed according to their occurrence in the major fox squirrel habitats. Utilization of mineral salts and water and characteristics of feeding habits are discussed. Bibliography of 7 titles.

Food Habits: Turkey

Martin, A. C., Franklin H. May, and Talbott E. Clarke. Early winter food preferences of the wild turkey on the George Washington National Forest, pp. 570-578, 3 tables.

Report based on field observations and 114 stomach analyses. In bulk, grapes, acorns, corn, and fruits of dogwood are the leading items, 93 percent of the food being vegetable. Consumption of the different foods is discussed in the light of their natural availability. A comparison of the plant foods of the turkey and the ruffed grouse from the same area is made in table and text. The turkey is favored by a larger proportion of openings than is required by the grouse.

[Bibliographers note that a slip in marking copy for the printer resulted in transposition of the names of the authors; May is the senior author.]

Life Histories: Bighorn

Allen, Joseph C. Ecology and management of Nelson's bighorn on the Nevada mountain ranges, pp. 253-256.

This subspecies has been reduced by pot and trophy hunting to pitifully small remnants. Natural enemies especially eagles require control if this sheep is to be increased in numbers, but poaching is the greatest obstacle and must be stopped. Information on the life history of the bighorn included in the article relates to its range preferences, daily and seasonal movements, food habits, mating, and lambing. Development of water supplies and other management procedures are suggested.

Life Histories: Deer, Mule

Rasmussen, D. I. Mule deer range and population studies in Utah, pp. 236-243, 1 fig., 5 tables.

Studies were made chiefly in the Logan Canyon area of the Cache Nationa Forest, which is mapped and briefly described. Estimates by the Forest Servic show rapid increase in the deer herd despite open seasons on bucks. Winter censuses on the study area revealed about 3,000 animals in 1938-39; the sex ratio was 1 buck to 3.17 does in 1937-38, and 1:3.59 in 1938-39. Winter range is insufficient and considerable feeding has been done. It does not completel check winter losses attributed to malnutrition nor does it prevent over-utiliz tion of browse. There is no evident conflict in use between deer and livestoc on either area as the winter range is not grazed by domestic stock and the summer range at present provides abundant feed for both classes of animals. The summer population, according to sample counts, is about 17.2, and the wint numbers from 200-300, deer per square mile. Results as to removal of deer by hunting in 1936-38 are given in a table that records also age classes and average weights of the animals. Tagging studies revealed that there is very little migration of deer on or off the area and, therefore, that the Logan Canyon deer population constitutes a fairly distinct herd. There is a summary and bibliography of 4 titles.

Life Histories: Deer, White-tailed

Chapman, Floyd B. The whitetail deer and its management in south-eastern Ohio, pp. 257-267, 2 figs., 1 table.

History of the deer population of the State, and summary of a recent st (1935-38). The form involved is the southern white-tail (Odocoileus v. virginianus), notes on the present numbers and distribution of which are given From author's abstract: The purpose of the investigation was to obtain basic data for a deer management program in Ohio, in order to forestall the develop-ment of a "deer problem" such as that existing in neighboring States. Deer n occur in 30 Ohio counties, with the greatest concentrations along the Pennsyl-vania border and in the Scioto-Adams County area of southern Ohio. Pertinent facts in the life history, including sex ratios, adult-fawn ratios, time of antler fall, mating period, fawning period, number of fawns per doe, and othe statistics are presented. Causes of mortality (poaching, dogs, and accidents are discussed. Malnutrition is apparent after severe winters, but as yet the have been no losses due to starvation. Seasonal food and cover preferences a recorded in tables. Water and salt requirements were investigated, and it wa found that drinking water is not necessary for deer in southern Ohio. Salt licks and salt blocks were utilized only by does, and by them only in the sum months. The white-tail deer has an important place in the wildlife land use program projected for southeastern Ohio, and the educational, esthetic, and economic possibilities of the species are stressed. The paper is concluded w a list of management recommendations and a bibliography of 9 titles.

Life Histories: Dove, Mourning

Pearson, Allen M., and George C. Moore. Nesting habits of the mourning dove in Alabama, pp. 468-473, 1 fig., 2 tables.

Authors' summary: "Data are presented for 592 mourning dove nests in Alabama. Nests were built in numerous species of trees, but more in pines than in all other kinds combined. The nesting sites ranged in height from on the ground to 65.9 feet, with a mean of 21.72 feet and a modal interval of 11 to 15 feet. A typical nesting period of 33 days covered nest-building, 7 days; incubation, 14; and the nestling period, 12. The nesting season lasted from late in February until mid-October. A total of 47.8 per cent of the functional nests under observation were destroyed by predators, winds, or other agencies. x x x Management to improve nesting conditions for the mourning dove in Alabama appears impracticable. There is at present no shortage of suitable nesting sites. An innate characteristic of mourning doves that causes them to use nests of flimsy construction evidently cannot be changed. It may be that nest predators should be reduced in some localities, but further study is needed. The most important dove-management problem at present in relation to nesting is proper adjustment of the hunting season to the nesting period. Adequate nesting data are now available for use in placing the mourning dove hunting regulations of Alabama on a sound basis."

Life Histories: Ducks

Hochbaum, Albert. Waterfowl studies at Delta, Manitoba, 1938, pp. 389-394, 4 tables.

First season's results of an ecological study of waterfowl on a marsh adjoining Lake Manitoba. Reports are made on sex ratios by species (average for river ducks 41:59, for diving ducks 52:48), age ratios (adults to juveniles: lesser scaup 26:74, blue-winged teal 28:72), composition of shooting kill (mallard 30%, lesser scaup 26; canvasback 16), and behavior during the flightless period.

Life Histories: Grouse, Sharp-tailed

Baumgartner, F. M. Studies of the distribution and habits of the sharptail grouse in Michigan, pp. 485-490.

First authentic record in 1904. Numbers increased and the bird suffered a drop in population along with the ruffed grouse and prairie chicken in 1932-33. All of these birds are again on the upswing, the sharptail is locally abundant, and the kill in 1937 was around 10,000 birds. Behavior in winter, food habits, and mating activities are described. In a local study, nests were found in clumps of herbs near brush or woodland cover, the average hatching date June 12, and the average clutch 12+. Broods average 7.3 chicks in August. Favored habitat is described and parasites listed. Efforts at artificial propagation have been blocked by difficulty in rearing the young. Notes are given on transplanting experiments. Bibliography of 4 titles.

Life Histories: Muskrat

Enders, Robert K. The corpus luteum as an indicator of the breeding of muskrats, pp. 631-634, 1 fig.

Exact information on the breeding season as a guide to trapping policy is a great need in the fur industry. This study of gonadal development was based on material collected in eastern Maryland. Progressive histology of the ovaries is described and the following conclusions reached: "From the results of these studies it is concluded that in sexually mature Maryland muskrats, ovulation--and hence probably breeding--begins about the first of February. The first ovulatory cycle ends in March and a second begins at once. If the gestation period is approximately 29 to 30 days, as is frequently reported, th time between the onset of the first ovulatory cycle and late March is long enough to enable the animals to produce a litter. If the second cycle is of equal length, three litters could be produced by the end of May."

Life Histories: Prairie chicken

Bennitt, Rudolf. Some agricultural characteristics of the Missouri prairie chicken range, pp. 491-500, 2 figs., 5 tables.

The original distribution of the prairie chicken in the State is discussed, as well as its quondam numbers and their subsequent fluctuations. Results of a census in relation to soil types and land uses are presented in the text, in a map, and in tables. Author's summary: "The kill by man, thoug illegal, continues to be an obstacle to the recovery of the species. The exis tence of a cycle has not yet been demonstrated. Since 1900, according to the few records available, the population has fluctuated between a maximum of 12,500 (1907) and a minimum of 5,110 (1934); a marked increase occurred in 19 and 1938. According to the 1938 spring census, 6,630 birds occupied 1,032 square miles, a density of 6.4 birds per square mile; 5.1 per cent of the potential prairie range was occupied at that time. The distribution was virt ally restricted to medium and low-grade prairie soil types, differing from th unoccupied soil types in the following respects: Lower land values and corn productivity; higher per cent of land in sorghums, annual legumes, tame hay (northern Missouri), and wild hay (southwestern Missouri). Essentially the same differences were found on comparing occupied and unoccupied townships on the same soil types. Agricultural trends since 1934 indicate the continuatio and extension of these characteristics of the prairie chicken range."

Life Histories: Shoveller

Girard, George L. Notes on life history of the shoveller, pp. 364-371, 4 figs.

Research on life histories as a guide to refuge management as exemplified by a study of the shoveller on two bird refuges in western Montana. Not on numbers of this species in migration and in the breeding season, proximity of the nests to water (average 61-93 yards), nesting cover used (short grasse 56%), distinguishing hatched eggs from those otherwise broken, predators (re-

loss of
sponsible for/8.45 percent of the total number of eggs), egg laying, incubation and hatching, survival of eggs and young, and food.

Life Histories: Woodcock

Aldous, Clarence M. Studies on woodcock management in Maine, 1938, pp. 437-441.

Third progress report, dealing with singing grounds, nesting cover, abundance, banding studies, limiting factors, and food habits. Of 11 artificially prepared singing grounds, 5 were regularly used.

Management: Clearing

Burlington, H. J. Land-clearing for wildlife in southern New Jersey, pp. 546-548, 4 tables.

Experience proved that maintenance of food patches increased carrying capacity for bob-whites on marginal lands, the dominant vegetation of which is described. Clearing areas for the patches by conventional methods required 146.9 man-hours and 41.9 tractor-hours per acre from woodland to seedbed. Using a brush-cutter greatly reduced those items, the work averaging in 3 instances, which are tabulated, 17.4 man-hours and 9.6 tractor-hours per acre. The brush-cutter method is by far the most economical.

Management: Farmer-sportsman relationship

Benjamin, J. R. The Ohio plan of State-supervised hunting on private lands, pp. 635-644, 2 figs., 6 tables.

Organization of the Bureau of Game Management, Propagation, and Protection and of its campaign to improve farmer-sportsman relationships in the State. Notes on agreements between the parties concerned and on operations under the supervised hunting plan. Author's summary:

"1. The State Supervised Hunting Association Areas are proving beneficial to everyone concerned. The landowners are gratified with the orderly harvest of only the surplus of game each year, without damage to property or danger to livestock. From the fifteen areas operated during the 1938 season there was not a single complaint of property damage, livestock injury or personal danger to farm residents. The sportsmen were pleased with the privilege of hunting where they were welcomed and game was assured. They were enthusiastic over the feeling that there was no danger of their being ejected for trespassing as long as they stayed within the boundaries of the Association Area. The Conservation Division was well pleased with the knowledge of a service well rendered to its constituents.

"2. The principle of 'first come, first served' was strictly adhered to. No permits were issued in advance and no favoritism or exclusiveness was permitted. The emphasis was placed on service to the general public.

"3. True cooperation was emphasized, with the landowners furnishing the land and the game crop; the hunters doing their part by complying with the rules of good sportsmanship and the regulations printed on the permit tags; and the

Conservation Division serving as intermediary to bring the two groups to a mutual understanding and to finer relationships.

"4. No limits were set as to size of areas, but as a general rule they should not be too small to justify the full time services of a checking statio attendant and a patrolman, nor so large as to encourage hunters' poaching around the edges rather than going to the central checking station.

"5. In cases where similar groups are organized in the future by private persons, they must adhere to the above principles in order to secure the approval and support of the Conservation Division. A small fee might be permissible, but only an amount sufficient to pay for the cost of supplies and the hiring of the limited personnel necessary to operate the area.

"6. The Conservation Division plans to carry the program through the 5 years contracted for, in order to accumulate data on which general recommenda- tions can be based and to demonstrate the method to as many groups as possibl By the end of that period we can make more general suggestions for plans to b presented to private groups who might want to adopt the system in their local communities.

"The plan has proven to be flexible, economical and extremely popular a at least a partial solution of the problem of finding better places for more sportsmen to hunt under favorable conditions for everyone concerned. It is n copyrighted, but is offered to any group who may wish to adopt it, as being a plan of farm-game harvest that has been tried and NOT found wanting."

Management: Farmer-sportsman relationship

Leopold, Aldo, George W. Wood, John H. Baker, Walter P. Taylor, Lester G. MacNamara, Harold Titus, G. W. Bradt, Justus H. Cline, and Walter F. Kirk. Farmer-sportsman, a partnership for wildlife restoration, pp. 144-166, 176-192.

Leopold. Discussion of changes that have taken place since the adopti in 1930 of an American Game Policy, under the headings used in that document. Three of them relate specifically to the topic of debate. The 1930 policy advised recognition of the landowner as the custodian of public game, but the idea is still more of a hope than a reality. Rather States are now urging farmers not to post lands and are offering free game birds and eggs and grain for winter feeding to keep them from posting. Good wildlife habitat, necessa to steady wildlife production, can be achieved only by conscious effort, how- ever, and it is not likely that farmers are going to create food and cover fo wildlife unless they have the final word as to who hunts and how much. Wild- life cropping must grow from inner convictions and these are not to be imme- diately implanted. Of numerous local trials of farmer-sportsman game managem most have come to grief. Some persist as research units but a few survive by reason of their merits. Ohio and Texas examples are cited.

Other topics discussed are indicated by the headings: Extend public ownership and management of game lands; train men, find facts; recognize the protectionist and the scientist; provide funds.

Wood. Legal discussion of game as property of the State, the landowne having no peculiar rights in it, but in fact being in position to control its

taking through trespass prohibitions. The general rule is that no person has any right to enter the land of another without his consent. Difficulties have arisen from sportsmen ignoring that rule and from their deeds too often verging on vandalism. Fair dealing would have contributed to a happier relationship.

Baker. Reprint of this contribution under the title "No wonder the farmer's frantic" was abstracted in WILDLIFE REVIEW, No. 20, May 1939, p. 23.

Taylor. So much of the area available for game management being in private ownership, the movement, to be a success, must devote especial attention to those lands. Taylor discusses a program under 9 headings stated as principles. Wildlife should be considered in farm planning so far as warranted by economic considerations. Continuous research and extension are necessary. The optimum not the maximum herd of game should be the objective. Protection of environment from destructive influences is required as well as positive improvements. Among the latter, providing good headquarters cover so as to increase coveys of quail, and diversification of both farm and natural crops are recommended. Harvest must be regulated so as to assure preservation of seed stock. In some way, although not necessarily by cash payment, the sportsman must make it worthwhile for the farmer to produce game. Technically trained game managers should be more widely employed by groups of landholders where individual estates are not large enough to warrant the expense. Non-game species should not be neglected; in fact the whole ecological complex should be considered and natural methods preferred. "Emphasize the essentials. But what are the essentials? They may and probably should differ according to conditions. For everyone, everywhere, it appears that the provision of food and cover and protection, and further research are essentials. Importation of exotics, killing of fur animals hawks or owls, extensive plantings, expensive propagation, do not impress modern game managers nearly so much in the big program as the protection of valuable species, the conservation of native wildlife, saving the soil, and conserving the natural vegetation."

MacNamara. In New Jersey the incentives for the farmer to produce and maintain game are mainly: (1) Monetary profit; (2) his own hunting pleasure; (3) value of certain species of game in insect and weed control; and (4) protection afforded by an organized relationship between farmers and sportsmen. The laws provide for sale under license of artificially or naturally propagated game but only a very small percentage (1.5) of the landholders take advantage of the opportunity. Farmer-sportsman clubs, another arrangement tried, succeeded to about the same extent. Distribution of pheasant eggs to stimulate artificial propagation proved unproductive and was discontinued. To convince farmers that game crops can be produced by agricultural methods and provide supplementary income, education and particularly demonstration is required. With that in view, the State Fish and Game Commission in 1936 established a demonstrational area including a 20-acre refuge surrounded by 500 acres open to hunting. Post-season counts in 1937 and 1938 indicated that pheasants and rabbits survived in sufficient numbers to make restocking unnecessary. It is believed that the plan can be extended by leasing unused bits of farm lands as refuges and permitting hunting on adjacent acreage.

Titus. In Michigan the private shooting preserve act [similar to one now in effect in New Jersey] was repealed because of resentment of sportsmen over the more liberal shooting privileges permitted on these areas. Michigan has an effective trespass law but probably not more than 20 percent of the la owners refuse permission to hunt except on the overcrowded opening day. Pheasants follow good soil, hence the cost of public shooting grounds is prohibitive. Competition may prevent hunting always where one pleases and the situ tion is hardly worse on farmed than on wild lands. The take of farm game is high in Michigan and the speaker believes that the situation is not so bad as indicated by the complaints of hunters.

Bradt. The Williamston plan of cooperative hunting control was starte in Michigan about 10 years ago and has steadily gained new adherents. The pl has 3 basic features. "The first one is that a group of farmers post their land as a unit, using uniform signs instead of individual No Hunting signs. Hunting is by permission ticket only. The hunter has to drive in the farmer' yard, ask for permission to hunt, and if he gets it he receives a ticket whic gives him permission to hunt on whatever area the farmers have agreed upon. leaves his car 'in hock' in the farmer's yard. That is very important. Whil he has that ticket the farmer has his car. When he is finished hunting and turns in his ticket the farmer then lets him take his car." Nearly a hundred clubs dealing with about three-quarters of a million acres are being operated under the Williamston plan. Eighty-five percent of the farmers favor the pla while 15 percent are more or less dissatisfied. Hunting pressure is reduced and local hunters have an advantage in lessened competition that they appreci ate. Farmers become interested in game and think less about trespass trouble Difficulties are chiefly due to failure of participants to live up to the rules. Hunters go in too large parties and take too many dogs; these things result in denial of permission to hunt. Various human and essentially uncontrollable factors hamper the system; in general it works best at a distance from large cities. Fees are objectionable to farmers as after paying them so hunters think they "run the place"; nor do farmers want pay from the State Department of Conservation because that would give it "a finger in the pie." Farmers wish to run their own business and keep everybody else out.

Cline. The destiny of wildlife is in the hands of the landowner. The two most important landowners are the farmer and the government (Federal or State). The government should set the example in wildlife conservation and management. The farmer, as a rule, though a conservationist is not a sportsm He is primarily concerned in making a living from the land and in a majority instances is having difficulty in doing it. He cannot afford to produce wild in preference to domestic, stock, as he does not have the same property right in it and cannot, therefore, derive an assured income from it. Plans for sol ing the difficulty do not seem to work very well as they do not coordinate th various interests legitimately concerned. Farmers can be interested in a genuine broad-guage program of conservation and will welcome cooperation of sportsmen toward that end.

Kirk. The farmer is a modest capitalist whose investment is in the acres from which he must wrest his livelihood. He works for about 20 cents a hour and must buy things produced by labor paid for at from 50 cents to a dol

an hour; he is in rather an impossible economic position. He, however, produces game and the sportsman who wishes to hunt it contributes little. The hunter's license fees and other expenditures give him no rights over the game nor no privilege of entering private property. These things are not said unkindly but only that the thing may be seen as it is. The farmer is interested in broad conservation in which the things that seem of most concern to sportsmen are just a part and maybe a small part. A great deal depends upon the attitude of those who approach the farmer, but the latter, granted fair treatment, will be glad to discuss the problems of wildlife propagation, better conservation methods, and a united program.

Management: Farmer-sportsman relationship

Short, Alexander W. Improvement in farmer-hunter relations in Ohio, pp. 514-518.

Review of conditions that led to general posting of farms in Ohio. Appointment of game management agents and direction of their services toward alleviation of the situation. From author's abstract: The problem is one of education. In the Ohio program, the farmer comes first, the farm youth second, and the sportsman third. The attitudes of farmers are being improved by (1) the formation of sportsmen-farmer organizations, with farmers constituting 50% of the membership, (2) subsidizing wildlife improvements on individual farms through the AAA program, (3) educating the county agents so they in turn can carry the message of conservation to the farmer, and (4) the use of game management agents to assist farmers in producing crops of wildlife. Farm youths are being educated by: (1) Weaving conservation principles into all school courses from grade school through high school, (2) introducing project work in game management by FFA and 4-H Club boys and girls under supervision of game management agents, and (3) sending outstanding boys and girls in 4-H Club work to participate in a full week conservation course at an outdoor camp. Sportsmen's organizations are working for better understanding with the farmer by: (1) Subsidy of food and cover improvements on farms, (2) actual participation of the club members in making improvements, and (3) by payment of small fees to the farmer for the privilege of hunting. In the Ohio game management program, production is guaranteed through habitat improvement and protection, and the harvest is regulated to the satisfaction of all by several methods of controlled hunting.

Management: General

Day, Albert M., Carl D. Shoemaker, and P. J. Hoffmaster. Is the Pittman-Robertson Act functioning properly for wildlife?, pp. 12-24.

Day. In the first 7 months of the functioning of the Act, all but one State filed intentions to participate, 7, however, requiring some legislation before they could comply with the provisions of the Federal law. Twenty-eight States had submitted 50 projects of which 24 had been approved. The nature of these is discussed; they involve purchase of lands, development of areas for wildlife, and study of management problems. The sums involved and accounting requirements are briefly stated.

Shoemaker. Remarks upon passing of the Act and suggestions for supporting legislation.

Hoffmaster. The functioning of the Act should result in States becoming better informed about work in other States; under central coordination, provincial attitudes should be modified, and the number of plausible but worthless undertakings should decrease, including those mistakenly urged by influential local groups.

Management: Harvesting antelopes, Oregon

Einarsen, Arthur S. Oregon's open season on antelope in 1938, pp. 216-220, 1 table, 1 map.

Author's abstract: "Oregon held an open season on antelopes in 1938 fro October 28 to November 1, inclusive, on a controlled plan. For the past twenty five years the taking of antelopes had been prohibited. Results of the open season proved that these shoots must be controlled. Hunter success was 72.34 per cent efficient; 242 hunters bagged 175 antelopes. Bucks and does were take in equal numbers. The regulations should limit each hunter to one antelope. Seasons should be short, as the animals congregate in ever-increasing herds as the open season progresses. The number of persons in hunting parties should be less than four. The season in Oregon should fall between October 1 and 15. Unit hunts permit orderly game cropping, with limited personnel. Rules for hunting antelopes should encourage skill in stalking, as random long-range shooting results in waste. Guns with a bullet having 1400 foot-pounds energy or more at 100 yards should be used."

Management: Harvesting deer, Wisconsin

Sanders, Roy D. Results of a study of the harvesting of whitetail deer in the Chequamegon National Forest, pp. 549-553, tables.

On this forest of more than a million acres, the deer population is estimated at 50,000. Drives revealed the animals in numbers from 2 to 272 per section. In severe weather the deer are restricted to 6.1 percent of the gross area of the forest, the average estimated concentration being from .56 to 2.4 deer per acre of wintering yard. Overpopulation impends and special open seasons have been arranged to prevent it. The article is mainly a summary of data obtained through checking stations for hunters in 1937 and 1938. This information includes number of hunters, legal and illegal kill, daily bag, time required to get a deer, success ratio, methods of shooting, caliber of weapons, and wastage (37%).

Management: Herd regulation

Dixon, Joseph S., and E. Lowell Sumner, Jr. The deer problem, deer trapping, and deer removal at Zion Canyon, Utah, pp. 231-235, 2 tables.

When Zion National Park was established in 1918, much of the natural forage had been destroyed by cattle. After 10 years of protection, the canyon

floor was again covered by vegetation and fully restocked with deer. The deer further increased and overbrowsing ensued. Mortality became abnormally high./ As hunting on surrounding areas did not effectively reduce the herd, trapping was resorted to and the animals released where they were wanted. Methods are described.

Management: Inventory, cottontail

Hendrickson, George O. Inventory methods for Neomys' cottontail, pp. 209-215, 4 tables.

Author's abstract: "An inventory of cottontails in July is desirable in Iowa because the shooting season opens August 1 unless the Conservation Commission finds the population too low. The fecal pellet count to a square foot of feeding range with one cottontail to an acre was computed as 0.66 pellet, accumulated for three months, May-July, from a base figure of 320 pellets, the average for one cottontail in 24 hours as found with caged animals, two adults and one juvenile, on succulent summer diets. The fecal pellet count to one square foot at 1.5 rod intervals with one rabbit to an acre was 0.52 pellet late in July as counted on feeding ranges of 22 observed cottontails, 1935-38. The variations between the average square foot pellet counts for the 22 rabbits and the expected 0.66 were not significant statistically. Hence 0.52 pellet was taken as an index of one cottontail to one acre of feeding territory late in July.

"In Davis County, southern Iowa, the average count was 2.55 pellets to a square foot, which indicated 4.8 cottontails to the acre of feeding range. Driving by automobile for five-mile trips at various times of day, the writer saw most cottontails at 6:15-6:30 a.m. Along the sides of the road, feeding cover such as tall grasses, small grains, and legumes with shrubby or weedy cover was found on 0.39 of the acreage within 20 rods of the road. The expected number of cottontails to one mile of road was computed as 140, and an average of three to a mile was seen at 6:15-6:30 a.m. The ratio was 3 seen to 140 expected or 1:46. In Boone County, central Iowa, the average count of 0.66 pellets to a square foot indicated 1.2 cottontails to a feeding acre. In that county along the sides of 3.2 miles of road, 0.47 of the acreage within 30 rods was considered to be supplied with protective and feeding cover for cottontails. The expected number of cottontails to a mile was 45 and an average of 0.75 cottontail was seen in auto drives at 6:15 a.m. The ratio is 0.75 seen to 45 expected, or 1:60 for an estimated population of 1.2 cottontails to an acre.

"That dew conditions should be considered was recognized for in walking one of the 3.2 miles in Boone County at 6:30 a.m. for seven mornings, an average of 4.7 rabbits were seen when there was heavy dew, approximately two was the average seen when dew was medium to light on 12 mornings, and an average of 0.6 was seen when dew was not discernible. Beating buckbrush, with bluegrass undercover, in the heat of afternoons, yielded four cottontails to an acre in Davis County, whereas beating thickets in Boone County yielded none. In mid-December tramping through feeding cover such as ungrazed weedy bluegrass, buckbrush and bluegrass, and cornfields yielded an average of approximately three cottontails to an acre whereas in Boone County only 0.08 to an acre was the average."

Bibliography of 4 titles.

Management: Inventory, deer

McCain, Rendal. The development and use of game drives for determining whitetail deer populations on Allegheny National Forest, pp. 221-230, 2 figs., 1 table.

Description of this Pennsylvania forest. The deer herd was estimated at 40,000 in 1938, probably three times the number that can be maintained on the depleted range. Losses from all causes in the same year were 27,000. Qualifications of satisfactory game drive areas are cited and the method of driving described. Crews of CCC workers 100 or more in number were employed. Doing the work in this way is expensive and it is hoped that a more economical means will be found. The table gives the results of drives held from 1935-38, inclusive, in terms of acres per deer. Estimated total populations and losses from 1934-38 also are given. Bibliography of 7 titles.

Management: Planting aquatics

Sharp, Ward M. Propagation of Potamogeton and Sagittaria from seeds, pp. 351-358, 4 figs.

For practical large-scale handling of the seeds of duck potato (Sagittaria latifolia), sago pondweed (Potamogeton pectinatus), and flat-stemmed pondweed P. zosteriformis), it was necessary to develop methods different from those previously recommended. These are described, including harvesting, preparing, storing, testing, germinating, and planting.

Management: Planting for wildlife and erosion control

Edminster, Frank C. Hedge plantings for erosion control and wildlife management, pp. 534-541.

Author's summary: "Planting and care of hedges is a valuable tool for soil conservation and wildlife management. A managed hedge is quite different from an ordinary wild hedgerow and its values and requirements should be explained to the farmer with great care. Hedges are most valuable when planted on the contour and may be located along contour fences, on other contour field boundaries, at the top of the filter strips above diversion terraces and on other strategic contour lines. A number of woody plants may be used for hedge plantings that will produce a low, thick-growing stand requiring little maintenance. Two or more species should be used in each hedge, planted in a double row with staggered 2-foot by 2-foot spacing. From 200 to 600 feet apart is a desirable spacing of hedges on a slope. Some maintenance will be required just as with any other farm crop. By proper planning, hedges may be used to the greatest possible benefit of the land and its products."

Management: Planting for wildlife and erosion control

Franklin, Sydney. Mulching to establish vegetation for wildlife and erosion control, pp. 508-513.

Author's abstract: "Within the past five years, the Soil Conservation Service has developed and put into use, especially in the Southeastern States, the practice of mulching eroded areas as an aid to establishing erosion-resisting vegetation desirable for wildlife habitat improvement. This paper defines mulching and discusses (1) the purpose of its use, (2) kinds of mulch--plant litter, mulch crops, (3) methods of application--simultaneously with seeding, premulching, (4) cost of application, (5) benefits to wildlife, and (6) farmer response to this method of establishing a dual-purpose vegetative covering for gullies and other severely eroded areas." Bibliography of 5 titles.

Management: Planting for wildlife and erosion control

Graham, Edward H. Legumes for soil and wildlife conservation, pp. 501-507, 4 tables.

Herbaceous legumes can be sown by direct seeding, do well on impoverished soils, which they improve, and are of considerable value in producing food for wildlife. Author's abstract: "The paper describes the use of leguminous plants by the Soil Conservation Service in its erosion-control program and shows how the species used are contributing to the improvement of wildlife habitats on agricultural land. The wildlife utilization of important erosion-resisting crop legumes is treated. Tables are presented, based upon a review of the literature and Bureau of Biological Survey stomach records. Tables 1 and 2 show the 15 genera and 10 species of legumes most utilized by wildlife for food, with the numbers of birds and mammals known to use each. Tables 3 and 4 list the 10 birds and 10 mammals which use leguminous plants most, with the numbers of legume species utilized by each. An interpretation of the tables follows, in the light of the use that can be made of legumes by the wildlife manager and soil conservationist." Bibliography of 15 titles.

Management: Pond development

Allen, Philip F. Development of ponds for wildlife in the southern high plains, pp. 539-542.

In this arid country the development of stock watering ponds offers, perhaps, the best opportunity of aiding wildlife. The cattle industry, wildlife management, and erosion control all are benefitted by maximum distribution of ponds. For wildlife, watering places with the vegetation that can be developed in and about them provide interspersion of food, water, and shelter favorable to more complete occupancy of the range. Vegetation protects ponds by trapping silt, reducing wave action, and protecting banks from burrowing rodents. Plants suitable for growth in the water and on the banks are suggested. The areas must be fenced, access for cattle drinking being allowed for, or better the water being piped to a separate drinking place. Hundreds of ponds are being developed. The response of wildlife, especially aquatic species, is gratifying.

Management: Pond development

Davis, C. M. Development of ponds as wildlife areas in Missouri, pp. 519-524.

A pond can be made one of the most useful parts of a farm, not only for storage of water for livestock, but also for wildlife utilization and erosion control. This article contains some hints on the construction of ponds but dwells mostly on factors improving them for wildlife, as fencing, providing wind breaks, making fish shelters, planting food and cover for both terrestrial and aquatic wildlife, and introducing vegetation to control silting and wave action. Lists are given of plants suitable for use in Missouri as silt strainers and bank binders, and for water and shore planting. The desirability of winter feeding also is mentioned.

Management: Quail, Valley

Dill, Herbert H. Winter feeding and shelters for the California valley quail, pp. 474-477.

At the Tule Lake Wildlife Refuge, feeders were operated in connection with shelters impenetrable to predators. Hawks caught quail at the feeders but this could be prevented by moving them to dense cover. Author's summary: "(1) California valley quail will readily use shelters and feeding stations. The lean-to type built at the Tule Lake Refuge has proved very satisfactory; (2) as the quail thus readily consumed a large quantity of the food offered they probably entered the nesting season in a healthy condition, a better natural reproduction being thereby insured; (3) an abrupt decrease in the quail population occurred in spite of protection from hunters, the providing of food and shelter and the control of predatory animals; (4) the loss of quail through certain predators during periods of heavy snow at Tule Lake was severe. Control measures and the furnishing of artificial shelters lessened the injury."

Management: Refuges

Henry, Cardie J. Response of wildlife to management practices on the Lower Souris Migratory Waterfowl Refuge, pp. 372-377.

The Souris River valley in North Dakota was originally a paradise for waterfowl but desiccation and drainage practically ruined it. Rehabilitation by the Biological Survey begun in 1935 has embraced water impoundment, fencing, control of blowouts in sandhills, planting of cover and food, construction of nesting islands, and control of predators. Notes are given on the succession of vegetation after flooding, the response of wildlife to the environmental alterations, and destruction of nests by predators. "The program at the Souris Refuge is directed toward a land use policy of maximum benefit consistent with the greatest possible production of desirable forms of wildlife. Success is clearly evidenced by the great flocks of birds that use the refuge in ever-increasing numbers. The general appearance of the area is gradually changing and the refuge is beginning to resemble the famed marshes described by our forefathers."

Management: Refuges

Smith, Robert H. Wildlife management practices for overflow areas of the lower Mississippi River region, pp. 395-399.

Too much shooting, deforestation, unrestricted pasturing of livestock, and increased height and duration of floods have greatly depleted wildlife in the bottoms. Management as practiced on the White River Laboratory Waterfowl Refuge in Arkansas is described with the suggestion that it may be applicable, more or less, to extensive similar areas. Plans must be made for adequate environment at times of both low and high water. In the development of low-water feeding areas, marsh plants are propagated on dry lake beds protected from ordinary rises of the river by dams. Chufa and wild millet are the most important foods in these places. To render the food available to waterfowl, the lakes must be reflooded by October 15; this is provided for by impounding water. At high water periods, waterfowl spread through the flooded woodlands to feed and plantings are being made to increase the food producing capacity of these tracts. Minor management suggestions also are made. The wildlife of the area and its reactions to changes in water level are described.

Management: Refuges

Stoenis, John H. Marsh management on the Great Plains waterfowl refuges, pp. 400-405.

Restoration of areas in this former important breeding ground for waterfowl includes impoundment of water, and the collecting, storing, and sowing of propagules of valuable plants. Progress in the handling of propagating material by the aid of relief labor is described. The species utilized and the best methods of gathering, storing, and planting each are discussed.

Management: Refuges

Towle, Robert E. Managing a western reclamation project for wildlife, pp. 383-388, 2 figs.

Plans for water regulation, planting, and management of Muddy Creek valley at the upper end of Lake Mead, Boulder Canyon Wildlife Refuge, Nevada.

Management: Stocking ducks

Benson, Dirck. Survival studies of mallards liberated in New York State, pp. 411-415, 3 tables.

Description of 5 areas on which releases of artificially propagated stock were made, and discussion of one season's results. The breeding success of the birds is presented in table and text, and also compared with that attained by black and wood ducks (mallard poorest of the three). Ducklings of varying age were released on 3 of the areas and the percentage of their survival rose with their age at time of liberation.

Management: Stocking, partridge, chukar

Nagel, Herman O. A preliminary report of the chukar partridge in Missouri, pp. 416-421.

Having on hand some hundreds of birds, it was decided to use them experimentally to determine the adaptability of the species to Missouri conditions, the relation of the partridge to other species, and its qualifications as a game bird. The plan of the study and the areas concerned are described. Density of release has been a bird to about 10 acres. Bands were applied to permit tracing of individuals. Of 1,350 partridges released, 84 were found dead. Predators killed 58 (foxes, 18; hawks, 16; house cats, 10); disease, 11; accidents, 6; and hunters, 3. Among a thousand birds liberated, 9 percent (46 pairs) nested and produced 430 young (average number per pair 9.3). Notes are given on diseases, food, and certain habits. No conflict with native species was observed. Figures are presented showing "survival" rates for both adults and young but their true significance is obscured because part of them (disappearance of whole coveys) probably do not represent actual losses. Suitability of range is discussed and the conclusion drawn that the mixed prairie and woodland area is best. Restless movement of entire coveys seems to be characteristic.

Management: Stocking, trapping pheasants

Hicks, Lawrence E., and Daniel L. Leedy. Techniques of pheasant trapping and population control, pp. 449-461, 2 figs., 1 table.

"Pheasant crops of the size demanded by present hunting pressures are produced only where every section of land contributes to that end." Methods of dispersing pheasants from refuges are discussed, of which trapping is the best adapted for restocking underpopulated areas. The average cost of trapping per bird for the past 5 years was 54.6 cents. The history of pheasant trapping in Ohio is related, and its advantages are discussed. Construction of traps is described and illustrated. Operation of the traps, handling the catch, transporting and releasing the birds, mortality associated with trapping, and selective trapping also are treated. Bibliography of 18 titles.

Management: Swan, Trumpeter

Hull, A. V. Trumpeter swans, their management and preservation, pp. 378-382, 1 table.

Trumpeter swans, restricted to 3 colonies, are now protected in all, the last to be guarded being that on Red Rock Lakes, Montana. Their presence was the leading reason for making this area a migratory waterfowl refuge. Sedentary habits of the birds contribute to their protection and the chief need is management that will increase their numbers. The swans use muskrat lodges as support for their nests and artificial nesting sites modelled after these structures are being multiplied; small nesting islands also are being provided. The birds are given full protection and privacy. Strict coyote control is exercised to save as many as possible of the swans and their young. Winter feeding is done on a large scale and additional feeding places will be developed. The article includes notes on the life history of the swans and the results of counts of trumpeters in the Red Rock Lakes and Yellowstone Park areas in 1936, '37, and '38. Respective totals: 108, 158, 148.

Natural History: Indication of age

Gower, W. Carl. The use of the bursa of Fabricius as an indicator of age in game birds, pp. 426-430, 2 pls.

The bursa of Fabricius (described and illustrated), apparent only upon dissection, is a dependable character for distinguishing birds of the year (7-9 months) from adults.

Propagation: Irradiation results

Burp, Gardiner, and Leonard Clark. Responses of game birds to irradiation, pp. 442-448, 3 figs.

Review of literature of which 8 titles are cited. The studies were planned to test the effects upon game birds of intensity, periodicity, and duration of artificial lighting. The conditions of the experiments are described and the results presented in graphs and text. Authors' summary: "To sum up, a moderate amount of light over and above normal stimulates reproductive activity among pheasants, quail and grouse during most periods of the year. Artificial conditions, exposure to an intensity of 5 f.c. continuously in the absence of daylight, or for a relatively short period (3 hours) in addition to normal daylight, so stimulated the gonads as to produce the largest number of fertile eggs from pheasants. Periodic illumination is more effective than continuous lighting. Exposure to alternate one-hour intervals of light and dark gave best results. It is possible that principles here indicated may serve to further clarify our understanding of the limitations surrounding the breeding range of certain species, as well as the beginning and ending of the period of egg production among many species in the wild."

Research: Bob-white's resistance to cold

Gorstell, Richard. Certain mechanics of winter quail losses revealed by laboratory experimentation, pp. 462-467, 1 table.

Extremely severe winters that occur about every 20 years decimate bob-white populations. Experiments were conducted to learn the reaction of the birds to cold. Characteristics of the quail huddle, and results of the experiments are described. The author's tentative conclusions are: "(1) That the characteristic huddling habit of the bobwhite quail may at least in part represent an instinctive reaction which tends to reduce the heat loss from the bodies of the various individuals which make up any given covey; (2) that, at least within certain limits, the ability of a covey of quail to withstand low environmental temperatures is directly proportional to the size of that covey; (3) that the body temperature of individual quail may drop more than 25° F. below normal without the bird's suffering a breakdown of its thermal regulatory system which would result in death.

"In closing, it seems fitting to call to the game manager's and sportsmen's attention the practical importance of the results obtained even from the few experiments so far completed. This lies in the indication that throughout

the northern portion of the quail range, the bobwhite coveys should not be shot down to a point where their chances of winter survival are seriously endangered simply by too great a reduction in the average size of the bevies."

Bibliography of 7 titles.

Research: Bob-white's response to predation

Errington, Paul L. Suggestions for appraising effects of predation on local areas managed for bobwhite, pp. 422-425.

Abstract, chiefly the author's: Much variation in response of bob-white populations to changes in densities of chief predatory enemies has been recorded in recent literature, 5 titles of which are cited. In analyzing these problems, experimentation on the land appears to show increasing promise of contributing significantly to our knowledge. This is especially true as concerns many of the complexities of quail-predator relationships, but work on these, to be scientifically acceptable, must be done with due awareness of important possible sources of error. Much inconclusive groping and misinterpretation of results may arise from confusion of primary and secondary types of predation, lack of correlation of predation with population phenomena of prey species, and failure to distinguish between actual changes in prey population levels following change in kinds and numbers of predators and mere reorientation of prey populations on a local scale. Study areas should be of sizes that include the full ranges of most of the coveys present.

Research: Experiment station

Allen, Durward L. A new wildlife experiment station near Allegan, Michigan, pp. 628-630.

Swan Creek Wildlife Experiment Station on a 55,000-acre leased tract that was purchased and developed by the U. S. Department of Agriculture in connection with its land utilization program. Notes on ecology of the area and on the program of investigation; management studies of the cottontail and raccoon first and of the fox squirrel and pheasant later. Management procedure proved practicable here can then be extended to suitable areas elsewhere in the State.

Research: Tracking

Stebler, A. M. The tracking technique in the study of the larger predatory mammals, pp. 203-208.

Usefulness of the technique is limited chiefly to regions and seasons having good snow cover. Granted that, the study amounts to almost the same thing as observing the animals themselves and contributes to knowledge of populations, sex ratios, breeding periods, denning habits, territories, and feeding habits. Suggestions are given on identification of tracks by their size and shape, by the odor of urine at scent-posts, and of the animals themselves. Other hints relate to determination of the number of animals making a trail and of those frequenting an area; to detection of the sexes and of sexual phenomena; and to food and feeding habits. Bibliography of 6 titles.

Research: Trapping, Pennsylvania

Wade, Douglas E. Economic survey and general inventory of native Pennsylvania fur-bearers, pp. 250-252, 1 table.

Preliminary report on a study of trapping in Snyder County, an area comprising 0.68 percent of the surface, and 0.19 of the population, of the State. Information gained by interviewing representatives of all families in the County reveals their activities in trapping, including trapper-family ratio, average age of trapper, proportion of licensees, number of traps, catch and its disposition, and income.

SPECIAL ARTICLES

Following are summaries of unpublished theses offered in partial fulfillment of the requirements for MS degrees by graduate students in the Alabama Cooperative Wildlife Research Unit at the Alabama Polytechnic Institute. They were submitted by Dr. Allen M. Pearson of the Biological Survey.

The conservation of wildlife in Alabama: A synthesis of materials for high school biology, by Julian C. Ivey. August 1936.

It should be borne in mind that the following is a summary of conditions, and does not represent conclusions. To the extent that the evidence permits, each section is an attempt to answer briefly the question raised in each problem.

PROBLEM 1. WHAT IS "CONSERVATION OF WILDLIFE"?

The most commonly accepted idea of the principle of conservation of wildlife is wise use of all of our wild bird, mammal, and fish life; its meaning is much broader than protection. Conservation of game is a narrow term, applying to the small percentage of wildlife classed as game species. Wildlife management and game management are applied sciences which seek to produce annual crops of wild animals for man's benefit in various ways.

PROBLEM 2. WHAT IS THE IMPORTANCE OF ALABAMA'S WILDLIFE RESOURCES?

Although possessing a variety of surface features, Alabama lies chiefly within one life zone, the Lower Austral. Its fauna is not as varied as that of some neighboring States, but it exceeds in the abundance of several species. The values of wildlife are chiefly for food, fur, recreation, and regulation of natural balance. Alabama shares in a nation-wide increase of hunting and fishing, whose decline for lack of game would affect many industries. The value of many non-game species is not sufficiently recognized, although it has been proved by research.

PROBLEM 3. WHY IS CONSERVATION OF WILDLIFE NECESSARY?

Man's policy in the past has caused the extermination of several formerly abundant species, and now threatens the existence of others, including migratory waterfowl, big-game, fur-bearers, predatory birds, and other non-game species. The decrease in wildlife due to direct killing and to destruction of habitat threatens an annual return estimated at a billion dollars. Factors contributing to destruction of habitat are: Deforestation; agricultural practices, including

grazing and forestry methods; fire, an acute problem in the South; soil erosion, both a cause of decrease and a fellow-symptom of cover removal; drainage, especially affecting waterfowl; and stream pollution, largely by industrial waste, for the control of which comparatively little has been done. Menaces to wildlife include: Increasing number of sportsmen, due to increased leisure and improved transportation; unsportsmanlike practices; improved weapons; general lack of respect for game laws; domestic animals, chiefly the cat; and diseases, especially serious at game farms and hatcheries. Weaknesses in the conservation field include: Conflicting administrative policies; non-cooperation between States; lack of a national game policy; clashing viewpoints of groups interested in conservation; and unscientific administration of wildlife resources.

PROBLEM 4. WHAT NATURAL FACTORS MUST BE CONSIDERED IN CONSERVATION?

The abundance of a species of wildlife depends upon the interaction of two opposing forces. One, the reproductive capacity, would bring about an amazing increase of a given species if the other, resistance of the environment, were removed. Natural checks such as normal wastage, accidents, diseases, and predators, together with unfavorable food and cover conditions, seem to set a limit to the number of a species on a given area. By regulating the resistance of the environment, man can produce an annual crop of game or fish for his own use. The environmental factors are so numerous and complicated that game and fish management require much additional research. One little-understood phenomenon is cycles, or periodical fluctuations in wildlife population. Under the condition known as the balance of nature, variations in relative numbers remain fairly constant over long periods. This balance is brought about by the various species acting as checks upon each other. When man decreases some species, introduces others, depletes the environment, or makes conditions temporarily more favorable than natural, the balance is upset. Wide variations in abundance of species then occur, and may become economically harmful. Allowing overcrowding, or decreasing abundance below that necessary to repopulate the environment, are both short-sighted.

PROBLEM 5. HOW HAS THE CONSERVATION OF WILDLIFE DEVELOPED?

Conservation methods seem to have been divided into five phases during written history. In the Old World, conservation of wildlife, chiefly through hunting restrictions, has been recorded since biblical times. Conservation in England and Europe has passed from this phase through the methods of predator-control, provision of refuges, artificial propagation, to environmental controls. Basing our wildlife administration on the English system, except that ownership of wild animals is vested in State instead of King, we have failed to conserve wildlife merely through hunting and fishing restrictions and have permitted predator control to be often unscientifically conducted. Governmental authority and international agreements have been found necessary for the conservation of migratory birds. Provision of refuges and artificial propagation have been especially emphasized during the past century. Recent emphasis is on control of all environmental factors, requiring scientific research and technically qualified administration.

PROBLEM 6. WHAT IS BEING DONE FOR CONSERVATION TODAY?

Conservation efforts are being made by numerous groups, working in many different ways. Governmental agencies with wildlife conservation as a major

objective include the Bureau of Biological Survey, Bureau of Fisheries, Forest Service, and National Park Service. Private organizations are numerous, among which the Audubon Societies and Izaak Walton League are probably best known. Organizations may be actuated by economic, esthetic, scientific, or other motives, often conflicting with each other; recently efforts have been made to unite all interested in conservation in one group, the General Wildlife Federation. Hunting regulations of which farmer-sportsman relationships may be considered a phase, are being increasingly based on scientific study. Recent investigations have revealed new values for animals formerly considered wholly harmful, and control operations are being improved. Increased emphasis is being placed on refuges as a means of insuring adequate breeding stock, and upon reservations as a means of preserving threatened species. Emergency appropriations and a policy of land-retirement have facilitated progress towards a more nearly complete refuge system. Artificial propagation continues to be necessary, with regulation of the environment as a factor often determining success of restocking. Present efforts along the line of environmental improvement include: Cooperative research and demonstration projects at land-grant colleges; the soil conservation program; correlation of forestry and wildlife management; efforts to control water pollution, including surveys and legislation. The importance of biological relationships is being increasingly recognized with research necessary to elucidate them in all phases of conservation. Research in progress includes: Studies of food habits, including forest wildlife relationships; bird banding, to determine migration routes and individual life histories; and research into wildlife diseases. Subjects on which additional investigation is especially needed are: Wildlife cycles; aquatic environments, particularly their food relationships; methods of propagation; and water pollution. Studies of regional problems of wildlife management, seeking to bring about improved general practices, are under way in Alabama and eight other States. Opportunities in game, fish, and other wildlife conservation fields include research, demonstration, and management, for which a lack of thoroughly trained men is at present manifest.

PROBLEM 7. WHAT CAN WE DO TO HELP WILDLIFE CONSERVATION?

In order to aid in solving conservation problems, it is necessary for us to keep informed concerning them and to give them publicity. In our own activities affecting wildlife, we should observe the rules of true sportsmanship. As a basis for intelligent conservation, inventory of wildlife resources is necessary. Such surveys may grow into a systematic study of birds and mammals. Many interesting publications on this activity are available, as well as on attraction and protection of song birds. We may be of very material help in insuring an annual crop of wildlife by maintaining year-round food and cover. Farm practices may be adapted to wildlife; the effort may be repaid in an annual crop of game marketed to sportsmen. Where conditions render it advisable, game birds may be propagated. Marsh and other water areas may be created or improved for waterfowl, fishes, and other wildlife. The study of fishes in relation to their environment may suggest better means of providing for them. Where control of species is necessary, it should be conducted on a scientific basis. Conservation may be given publicity by building up libraries, showing motion pictures, and exhibiting posters.

Recommendations for Further Studies. The writer recommends similar studies in other fields than wildlife conservation. That soil conservation has little up-to-date material suitable for teaching purposes. The problem of stream pollution seems to offer opportunity for emphasis in chemistry and general science courses.

A trial of the materials presented, to determine most effective teaching organization, placement, learning activities, methods of approach, and vocabulary weaknesses would afford opportunity for scientific study. Objective studies might be made in connection with the present curriculum program, to determine phases of conservation suitable for different courses, and methods of correlating them.

A study of conservation elements offered in teacher-training institutions offers opportunity for improving conservation teaching.

The importance of certain woody plants as producers of food for birds in east Alabama, by Elmer A. Jones. August 1938.

According to the number of birds feeding on them, pines, blackgum, and holly were found to be the most important food producers. Eighteen species of birds fed on seeds of pine, 11 on the fruits of blackgum, and 11 on those of holly. Pine mast was available from November to March and the fruits of blackgum and holly from November through April.

French mulberry and smooth-sumac were next in value. Nine species of birds fed on the fruits of these shrubs which were available throughout most of the investigation.

The fruits of oak, flowering dogwood, and Cherokee rose were available from November through March and were eaten by seven species of birds. Cherokee rose, however, is considered a pest in some sections of Alabama.

Four other plants providing food from November through March were patronized as follows: Shag-bark hickory by six species of birds; dwarf-sumac by five and indigo bush and hawthorns each by four species.

Russian olive ripened in January and remained on the bushes until the middle of April. The fruits were taken by five species of birds. Those of sugarberry, privet, and Japanese strawberry were consumed by three species of birds and were available from November through February.

Tulip-poplar, smooth alder, chaste-tree, and honeylocust were the least important food plants studied. Tulip-poplar and smooth alder seeds were observed eaten by only one species of bird each, while chaste-tree and honeylocust were not recorded as taken by any bird. The fruits of these four trees were available over a long period.

Studies on the food habits of the white-tailed deer in Alabama, by Dyer N. Ruggles. August 1938.

1. A study of the foods of the white-tailed deer was conducted in Sumter County in western Alabama.

2. The range on which the studies were carried on was well stocked but not overpopulated by deer.

3. Greenbrier was the single most valuable deer food for the year 1936-37.

4. Dwarf sumac also was important, ranking second only to greenbrier.

5. The oak family (Fagaceae) contributed more of the volume of deer food than any other single family.

6. Acorns were a preferred food and the deer ate them as long as they were available.

7. Broadleaved trees as a whole ranked higher than any other group of deer foods. Five other groups, listed in order of importance, were: vines, shrubs, conifers, herbs, and grasses.

The value of certain agronomic plants as food for bob-whites, by James W. Webb. May 1939.

1. Experiments were conducted over a two-year period with 30 species of plants to determine the value of each as an agronomic food crop for bob-whites in Alabama. Three plantings were made of each species each year at the main experiment station, and also at the Black Belt, Sand Mountain, Tennessee Valley, Wiregrass, and Gulf Coast substations, and in the experimental fields near Brewton. Observations were made at monthly intervals to determine desirable and undesirable qualities.

2. The plants found to be of most value for use in food patches for quail are listed in the order of their importance for three districts:

(a) Appalachian Mountains and Limestone Valley Soil Provinces: Korean lespedeza, common lespedeza, browntop millet, German millet, Texas millet, Laredo soybean, amber sorghum, sagrain sorghum, mung bean, Brabham cowpea, bene, Japanese millet, Florida beggarweed, and shallu sorghum.

(b) Central Alabama: Common lespedeza, Korean lespedeza, Florida beggarweed, sesbania (on low lands), browntop millet, German millet, Texas millet, Laredo soybean, mung bean, amber sorghum, brabham cowpea, bene, sagrain sorghum, and Japanese millet.

(c) Coastal region: Common lespedeza, Florida beggarweed, sesbania, browntop millet, German millet, Texas millet, mung bean, Brabham cowpea, Laredo soybean, bene, Japanese millet, proso millet, amber sorghum, and sagrain sorghum.

3. Lespedeza sericea and native vetch are considered valuable plants to be grown for quail in Alabama but insufficient information was obtained to classify them according to importance. They are recommended for use in all sections of the State.

4. Nine plants were found undesirable, namely: Kafir corn, hegari sorghum, redtop sorghum, Sudan grass, pearl millet, iron cowpea, partridge pea, pigeon pea, and Strophostyles helvola.

The helminth parasites of cottontails in the vicinity of Auburn, Alabama, by Eugenia Rutland Moore. August 1939.

1. A survey was conducted to determine the species and relative prevalence of internal parasites of cottontail rabbits in the vicinity of Auburn, Alabama, and to study their effect on rabbits and other hosts, especially on man and on domestic animals.

2. The survey was made during the spring and summer of 1939, 50 cottontail rabbits (Sylvilagus floridanus mallurus) being collected and examined principally for helminth parasites. The viscera, mesenteries, brain, and skin were examined, the parasites collected and identified, and the degree of each infestation noted.

3. Parasites were found in all except 2 very young rabbits with an average of 4.5 species per host (including the arthropod, Linguatula serrata). Six species of nematodes, four of cestodes, and one of trematode were found. The percentages of rabbits in which various parasites were found are as follows: Obeliscoides cuniculi, 88 percent; Cittotaenia variabilis, 76 percent; Cysticercus pisiformis, 64 percent; Dermatoxys veligera, 60 percent; Longistriata sp. (probably noviberine), 40 percent; Trichostrongylus calcaratus, 40 percent; Raillietina salmoni, 32 percent; Haastilesia tricolor, 20 percent; Trichuria leporis, 10 percent; Passalurus ambiguus, 6 percent; and Multiceps serialis, 4 percent. The arthropod, Linguatula serrata, was more prevalent than many of the helminths, being found in 40 percent of the rabbits. These results corresponded more closely, both in species of parasites and in their prevalence, to those of other surveys made of rabbits in the southeastern part of the United States than to those of more distant studies.

4. Only a few of the parasites found in these investigations appear to be particularly pathogenic to rabbits. Multiceps serialis and Trichostrongylus calcaratus are probably the most pathogenic species found, the former because of the pressure exerted on the tissues and the latter because of its toxic properties. All species, however, except possibly Passalurus ambiguus, are known to be capable of producing serious effects in heavy infestations. The damage caused by helminths, as observed by various investigators, includes: Destruction of tissue by their hooks or suckers or by extra-intestinal digestion; loss of blood; opening of atria of infection for bacteria; hindrance of proper functioning of organs by pressure on them; toxic effects; and inducement of malignancy, especially in the liver and lungs.

5. Cysticercus pisiformis, Multiceps serialis, and the larva of Linguatula serrata, which were found in a high percentage of rabbits examined, are a constant threat to the health of domestic animals. The adults of all three of these parasites infest dogs and the larva of L. serrata is common in cattle, goats, and sheep. The adult cestodes apparently cause little injury to domestic animals, but the arthropod is quite pathogenic. Many may also be infested with M. serialis and very rarely with L. serrata.

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Bibliography: Texas wildlife

Anon. A short list of wildlife publications with special regard to Texas, Texas Game, Fish, and Oyster Commission (Austin) Bul. 14, 31 pp. Revised June 1939.

A classified and annotated bibliography, restricted to recent publications, and giving addresses and prices at which they may be obtained.

Classification: Ground squirrels

Davis, Wm. B. The Townsend ground squirrels of Idaho, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 182-190, 1 map, 1 table.

Distribution (mapped), relationships, characters, ecology, and records of occurrence of 4 subspecies of Citellus townsendii.

Classification: Grouse, Spruce

Uttal, Leonard J. Subspecies of the spruce grouse, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 460-464.

Realignment involving 4 subspecies, one of which, Canachites canadensis torridus (Gaspe Peninsula, New Brunswick, and Nova Scotia) is described as new. For each subspecies, synonymy, range, subspecific characters, and list of specimens are presented.

Classification: Pocket gophers

Goldman, E. A. Remarks on pocket gophers, with special reference to Thomomys talpoides, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 231-244.

General discussion of the group; list, with type localities, of 42 subspecies; and description of 9 new subspecies.

Classification: Snakes, Natrix

Clay, William M. A synopsis of the North American water snakes of the genus Natrix, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1938(4), December, pp. 175-182.

Key, synonymy, diagnoses, and statements of range for 10 species and 14 subspecies.

Classification: Snakes, Sonora

Stickel, William H. The snakes of the genus Sonora in the United States and Lower California, Copeia (M. Graham Netting, Carnegie Museum Pittsburgh, Pa. 75 cents a copy), 1938(4), December, pp. 182-190.

Key, synonymy, type localities, diagnoses, statements of range, and remarks for 6 species and 5 subspecies.

Conservation

Leopold, Aldo. A biotic view of land, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(9), Sept. 1939, pp. 727-730, 1 fig.

Conservation hitherto dominated by economics should become more ecologic. The biota as a whole is useful and should be so viewed, dropping prejudices as to details. The interactions of animals is illustrated by food chains and the interdependences of organisms and of the soil by the biotic pyramid. The effect of evolutionary processes has been to lengthen food chains and heighten the pyramid, while man by getting rid of larger predators has reduced both. Native animals and plants keep the energy circuit open; others may or may not. Exploitive use of the soil impairs the base of the biotic pyramid. Restoration may require return to the factors that originally built it. Violent interference with the biota should be abandoned in favor of more natural management. "Wild-raised game does not require hawk-less coverts." Preservation of associated wildlife seems necessary to successful forestry. Even in agriculture, modification has proceeded too far for the best interests of the farm. A good farm is one where the wild fauna and flora has lost acreage without losing its existence. Conservation on private lands is essential and ecology may supply the arguments necessary to make it a reality.

Conservation

Murphy, Robert Cushman. Conservation IV. Garden Club of America Bul. (598 Madison Ave., New York, N. Y.), 7(4), July 1939, pp. 42-56.

Chiefly on the amenities of Long Island, N. Y., as affected by occupation of the area by man. Comparison of the flora and fauna as reported in 1670 and as they are today. Comment on the extirpated forms. "It is evident, of course, that our culture could never have developed in an entirely primitive environment, but we realize now that both the extent and the rate of unnecessary exploitation have been appalling."

Careless introduction of alien organisms is mentioned with special reference to the starling. Greatest objection is to the consumption of tons of food formerly available to winter birds. "Few persons perhaps realize this particular objection to the starling and to certain other aliens. I believe that it is the weightiest point of all. Mathematically one might say that it changes a thousand native birds of ten species into a thousand alien birds all of one species. This result is obviously a very undesirable upsetting of the balances from every point of view." [A different point of view might be noted. Some believe that no introduced species can become established unless it finds a vacant ecological niche.] The article concludes with discussion of the wasting disease of eelgrass and its effects upon brant. The conservation outlook is discouraging in many ways but with sufficient effort past mistakes may in part be overcome.

Conservation: Condor

Sheldon, H. H. What price condor?, Field and Stream (515 Madison Ave., New York, N. Y. 15 cents a copy), 44(5), Sept. 1939, pp. 22-23, 61, 6 photos.

Author's peroration: "I am a naturalist and a conservationist, and believe the passing of any species to extinction would affect me with more regret than would assail the average, disinterested individual. But to set aside a sanctuary in the belief that the condor will continue to exist is to act without knowledge of the facts. In the first place, the bird could not exist in even the most extensive sanctuary unless someone killed his meat for him. And in the second place, by setting up such a sanctuary, man would be sacrificing the recreational value of a large area in exchange for the extremely doubtful preservation of a bird of no value, esthetically or otherwise." [This goes to show that there are conservationists of varying degree; evidently some do not consider the condor lacking in values, esthetic or otherwise, or present efforts to preserve the species would not be made. Deprecatory remarks, earlier in the article, upon the habits of the condor are uncalled for; carrion-feeders exist in all lands and no line can be drawn between incidental, occasional, and regular carrion-eaters. Many a "noble" bird of prey does not disdain carrion in a "pinch". The extirpation of large predators did not entirely do away with the condor's sources of food. There is always natural mortality, the victims of which among present large deer populations, for instance, will support a certain population of condors. Hunting always leaves some victims for scavengers and the cattle industry regularly writes off a significant percentage of inevitable losses. These provide grist for the condor's mill. In any event nothing is to be gained by giving up all hope of saving this species. It is spectacular and success in preserving it would have a value in impressing the public that might pay big dividends in some other case.]

Conservation: Farm

Leopold, Aldo. The farmer as a conservationist, American Forests (919 Seventeenth St., N.W., Washington, D. C. 35 cents a copy), 45(6), June 1939, pp. 295-299, 316, 323, 4 illus.

Depletion of fauna and flora is not inevitable; many more forms have been lost through indifference than of necessity. Awkward use rather than overuse often is responsible for disordering a resource. Conservation should keep resources in working order; it needs the positive exercise of skill and insight --environmental engineering. It is largely a job for the farmer and requires interspersion of land uses in which ecologic and esthetic as well as economic considerations shall be given weight. An interesting and useful essay. [Comment on the thought that cycles "are spreading both in geographic sweep and in number of species affected" is that whatever the merits of that claim may be for cycles as periodic occurrences, it should not be forgotten that the basic phenomena are fluctuations, which the evidence indicates are, and indefinitely have been, universal.]

Conservation: Missouri

Stephens, E. Sydney. Conservation Commission of Missouri (Jefferson City) Organization, Policies, Transactions, July 1937 to July 1, 1939, 75 pp., maps, graphs, tables. 1939.

Quotation of State constitutional amendment of November 1936, history of its adoption, and ratification by the courts. Fundamental tenets of the Commission and summary of its activities in administration, protection, land acquisition, restocking, farmer-sportsman cooperation, research, and extension.

Conservation: Santee-Cooper Project

Kauffmann, Erle. Conservation over the dam, American Forests (919 Seventeenth St., N.W., Washington, D. C. 35 cents a copy), 45(10), Oct. 1939, pp. 487-491, 510, 524, 1 map, 3 photos; 45(11), Nov. 1939, pp. 546-550, 560-561, 4 photos.

October. Analysis of arguments for and against the Santee-Cooper Project, S. C. Conservation aspects are indicated and slated for later discussion.

November. Probable effects of the undertaking upon the human population of the affected area, and upon forests and wildlife. Diversion of a great part of the flow of the Santee River will permit salt water to come upstream and change the ecology of a region now resorted to by large numbers of migratory waterfowl. What the ultimate result will be can now be only surmised but in part, at least, the effects will be unfavorable. Upland wildlife, including the purest strain of wild turkeys in the Southeast, also will be adversely affected. The Authority in charge of the work proposes, however, to establish game sanctuaries on any surplus lands it may acquire. The generally shallow reservoirs to be impounded, proponents expect to be eventually favorable for waterfowl. The project was disapproved in advance by the Federal conservation agencies concerned, but for good or ill it is, nevertheless, under way. Only time can reveal the net wisdom or unwisdom of the undertaking.

Control: Crawfishes

Gowanloch, James N. Controlling crayfish damage to lawns, Louisiana Conservation Review (Louisiana Dept. of Conservation, Civil Courts Bldg., New Orleans), Summer 1939, p. 39.

By doses of liquids put in burrows which are then tightly closed: (1) Tablespoonful of a 1 lb. to 3 gals. solution of chloride of lime, and (2) 2-3 drops of carbon bisulphide, to each burrow.

Control: Crawfishes

Lyle, Clay. The crawfishes of Mississippi, with special reference to the biology and control of destructive species, Iowa State College Journ. Science (Ames, Iowa. $1.00 a copy), 13(1), Oct. 1938, pp. 75-77.

Abstract of a doctoral thesis. Rarely if ever has WILDLIFE REVIEW presented an abstract of an abstract; however, this paper apparently has not been published in full and its control recommendations, especially, may be of use to some wildlife managers. History, economic importance, classification, and biology of Mississippi crawfishes, particularly Cambarus hagenianus, are briefly treated. The control section is here quoted in full:

"The best control is the application of poison to the burrows when the water level is only a few inches from the surface of the ground, or from January to May in most years. Pyrethrum, commercial creosote stock dips, coal tar creosote, orthodichlorobenzene, sodium cyanide, turpentine, ortho cresole, cresylic acid, miscible pine oil, nicotine, carbon bisulphide, phenothiazine, and calcium cyanamid were toxic in laboratory tests in the order named. Ineffective materials included the arsenicals, rotenone, picric acid, pyridine, resorcinol, thallium sulphate, and several others. Pyrethrum was ineffective at the temperatures in the burrows. The creosote stock dips are recommended on account of their low cost and ease of application. With infestations of 10,000 burrows per acre the cost of material is about 50 to 60 cents per acre. Where the stock dips are not available at low cost, home-made emulsions of turpentine and creosote are advised. Applications on small areas may be made with compressed air sprayers. On large plantations a double-acting force pump, mounted on a wagon and supplying several leads of hose, is very satisfactory. Splendid results have been secured on large-scale tests covering several hundred acres."

Control: Fish-eating birds

White, H. C. Bird control to increase the Margaree River salmon, Fisheries Research Board of Canada Bul. 58 (Ottawa. 20 cents a copy), 30 pp., 13 figs., 1939.

More salmon were desired by anglers who variously blamed the shortage on commercial fishing at the river's mouth, poaching, climatic conditions, and natural enemies. (See Bul. 57 of the same organization.) Fish predators were studied by stomach and pellet analyses and by other means. Eight kinds of birds, 3 of fishes, and 2 of mammals are commented on. The last are considered insignificant but kingfishers and mergansers are estimated to consume 880,000 young salmon in a season. Experimental bird control for one year on a tributary of the Margaree River was followed by an increase of 121 percent in salmon smolts. The methods of control were shooting kingfishers and destroying their eggs, and shooting mergansers and trapping them in nets. The author does not urge general control, saying "Even though bird control increases the salmon of the Margaree, it does not follow that such control is desirable for all salmon streams. x x x The results indicate that these birds have a significant effect, but it is not claimed that there has been any proof either that in general they have a significant effect or that the best method of protecting young salmon is to eliminate birds from salmon streams."

[Comment: These are the saving words of a scientific investigator. Anglers and guides cannot be expected to approve them. It seems too bad that the entire game-keeper complex could not have been left behind with other undesirable elements of the old world. Sport is non-essential and it is not in the public interest to permit persecution of every living thing that seems to interfere with it.]

Control: Grouse predators

Edminster, Frank C. The effect of predator control on ruffed grouse populations in New York, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 345-352, 5 tables.

Author's abstract: "Experiments in southern New York covered 'complete' control, i.e. all predatory birds and mammals, and 'selective' control of foxes and weasels. Conducted over a period of five years with the grouse (Bonasa umbellus), populations were determined on the controlled areas and on check, i.e. no predator control, areas. Increased fall populations of grouse obtained on the controlled areas in years of increasing abundance, but there was no increase in years of peak abundance. Practicability of measures doubtful."

Control: Household animals

Gibson, Arthur, and C. R. Twinn. Household insects and their control, Dominion of Canada Dept. of Agr. Publ. 642 (Farmers' Bul. 71. Minister of Agriculture, Ottawa, Canada. 25 cents a copy), 100 pp., 101 figs. Third printing, June 1939.

Refers also to the brown rat; house, deer, field, and red-backed mice; shrews; squirrels; bats; weasels; house sparrow; and barn and cliff swallows. Some of these, not in need of control, are, nevertheless, the subject of correspondence from ill-informed complainants.

Control: Pocket gopher

Parton, H. L. Controlling pocket gophers, University of Minnesota (Minneapolis) Agr. Ext. Div. Extension Folder 75, 6 pp., 5 figs., June 1939.

Habits of the animals briefly described; control suggestions relate to finding main runways, and making and placing baits.

Control: Range animals

Stewart, George, R. H. Walker, and Raymond Price. Reseeding range lands of the intermountain region, U. S. Dept. of Agriculture Farmers' Bul. 1823 (Supt. of Documents, Washington, D. C. 5 cents a copy), 25 pp., 11 figs., 2 tables, July (August) 1939.

Upon the restoration of 5,000,000 acres of abandoned cropland, largely former dry farms, and 7,000,000 acres of overgrazed lands, depends the future of the livestock industry in the Intermountain region. Reseeding of the better soils is practicable but control of certain animals is necessary. "A heavy infestation of rodents will require the use of some measure of control to save new plantings. Where big game is especially abundant, high fences for protection against deer may need to be provided." The authors are even more emphatic about protection from grazing. "Grazing control is essential to the success of the reseeding project. x x x Most critical areas should be well fenced x x x

All the noteworthy successes x x x were achieved on land where livestock grazi was under control. Lack of livestock control brought many failures, even wher other conditions were favorable."

Control: Rat, Australia

McDougall, W. A. Notes on rat baits, rat poisons, and rat popula-tion, Cane Growers' Quarterly Bul. (Bureau of Sugar Experiment Stas., Brisbane, Queensland, Australia), 6(2), Oct. 1938, pp. 36-38.

Results announced in this paper may be of interest in the United States although the rat (Rattus culmorum) chiefly dealt with is a different species from those occurring here. Baits in the order of their utility, beginning wit the best, are: Rolled oats, cracked corn, whole corn, wheat meal, whole wheat barley, and bread. Adding linseed or corn oil increases attractiveness but no palatability. No appetizer will increase the intake of a poor bait. As to poisons, red squill, arsenic, zinc phosphide, and barium carbonate were unsati factory. All of these as well as strychnine and yellow phosphorus tended to reduce bait intake. Phosphorus is the most deadly of the poisons tested and thallous sulphate the most reliable.

A population of even-sized rats is more easily controlled than one of mixed ages. Thus rapidly reproducing "plague" populations are harder to deal with than "normal" ones. General continuous control may not be economically sound but control might best be applied where there is obvious damage.

Much the same account is given on page 43 of the 38th Ann. Rep. Queens-land Bur. of Sugar Exp. Stas. (Brisbane), 1938.

Cycles

Speirs, J. Murray. Fluctuations in numbers of birds in the Toronto region, Auk (Ludyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 411-419, 1 fig., tables.

Author's summary: "Some of the species of birds that have wintered in the Toronto region have fluctuated markedly in numbers from year to year. The peak years for any one of these species have tended to be separated by definit intervals, but variations from this average interval have occurred which have probably been distributed about the average value according to the probability curve. The peaks of abundance of the American Rough-legged Hawk, the Snowy Ow and the Northern Shrike have usually occurred at intervals of from three to five years, while peaks of the Pine Grosbeak have occurred at intervals of fiv or six years, and peaks of the Goshawk and Horned Owl have occurred at interva of from nine to eleven years. The peaks have occurred in the years immediatel following the maximum abundance of their food in the North. No evidence has been detected to suggest that lack of food drove the birds south."

Bibliography of 15 titles.

Destruction: Blackbirds

Odum, Eugene P., and Frank A. Pitelka. Storm mortality in a winter starling roost, Auk (Rudyard Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 451-455, 1 fig., tables.

Urbana, Ill. Authors' summary: "(1) A 'blackbird' roost was subjected to a driving wind and rain storm from relatively unprotected southwest and west sides; (2) the wind reached a maximum velocity of 48 miles per hour and was followed by a sharp drop in temperature and continued high wind; (3) the destructive combination of weather conditions occurred when a warm southeast wind suddenly shifted to the southwest and west; (4) a mortality of approximately 4% resulted in the 'blackbird' roost, the size of which was estimated at 25,000 birds; (5) a differential mortality among the species of the roost was apparent; the proportion of Grackles and Cowbirds to Starlings in the total mortality was considerably greater than that in the total roosting flock."

Destruction: By floods

Blair, W. Frank. Some observed effects of stream-valley flooding on mammalian populations in eastern Oklahoma, Journ. Mammalogy (Jno. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 304-306.

Relates mainly to small mammals as mice, shrews, and moles. The observations "indicate that severe flooding in years of abnormally heavy rainfall affects adversely the populations of small, terrestrial mammals inhabiting flood-plains in eastern Oklahoma. In the case of some wholly terrestrial species that are confined to flood-plain associations such flooding probably produces virtual extermination of these species in some parts of their ranges. The fact that the mole was found, without exception, in all of the flooded areas probably indicates that this species was quite successful in escaping the floodwaters and that it reoccupied the flood-plain after the water had subsided."

Destruction: Sea-lions

Abbott, Clinton G. Sea-lion slaughter, Bird-Lore (1006 Fifth Ave., New York, N. Y. 30 cents a copy), 41(5), Sept.-Oct. 1939, pp. 265-270, 3 photos.

Warfare of fishermen upon sea-lions, though from time to time interrupted, seems ever to spring up anew. A great many males were slaughtered for their genitalia, the basis of a medicine deemed restorative by the Chinese; present economic conditions have resulted in cessation of this inexcusable destruction. Now killing the animals for manufacture of dog food arises as a greater menace than any of the past. It is carried on in Mexico but conservationists have had to fight off efforts to remove protection from the animals in California. Eternal vigilance is necessary for conservation of the animals.

Destruction: Vanishing species

Scott, W. E. Rare and extinct mammals of Wisconsin, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(10), Oct. 1939, pp. 21-28, 5 photos.

Notes on 5 extinct, one reintroduced but dwindling, and 3 rare species; briefer mention of a few other uncommon forms.

Diseases and Parasites: Animal borne diseases

Wolf, William. Animals bring us diseases, Scientific American (24 West 40th St., New York, N. Y. 35 cents a copy), 160(5), May 1939, pp. 282-284, 4 photos.

Popular account of vertebrate borne diseases of which those carried by American wildlife are: Rocky Mountain spotted fever, plague, and tularemia.

Diseases and Parasites: Blood parasites

Huff, Clay G. A survey of the blood parasites of birds caught for banding purposes, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), N.S. 47(6), June 1939, pp. 615-620, 1 fig., 3 tables.

Parasites found in blood smears contributed by bird banders. Positive findings are reported for 32 species and negative for 49. Occurrence of 4 genera of parasites, and of the species of one of them (Plasmodium) in birds by systematic groups is tabulated. A second table shows the results obtained fro individual birds examined two or more times, and a third, infections in immatur birds. Bibliography of 11 titles.

Diseases and Parasites: Echinococcus

Riley, William A. Maintenance of Echinococcus in the United States, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 95(449), Aug. 1939, pp. 170-172.

Written with special reference to occurrence of this parasite in domesticated animals, the article includes also records for the moose, white-tailed deer, and timber-wolf among native mammals. Bibliography of 16 titles.

Diseases and Parasites: Eelgrass

Cottam, Clarence. The eelgrass situation on the American Pacific coast, Rhodora (Ludlow Griscom, M. C. Z., Cambridge, Mass. 20 cents a copy), 41(487), July 1939, pp. 257-260.

Although Labyrinthula, postulated by some as the cause of the wasting disease, has been identified in eelgrass from Departure Bay, B. C., inspection and reports representing a number of localities from Alaska to California do n

indicate any reduction of the plant along the Pacific coast. In European waters and on the American Atlantic coast improvement continues. In the succeeding article, "Environmental factors and the wasting disease of eelgrass" (pp. 260-262, 2 tables), Neil E. Stevens discusses the causes that have been predicated for the malady and says that further study is needed. He gives a bibliography of 6 titles.

Diseases and Parasites: Encephalomyelitis

Gwatkin, Ronald. On the susceptibility of ground squirrels to the virus of equine encephalomyelitis and ticks as possible vectors, Canadian Journ. Comparative Medicine (Gardenvale, Quebec, Canada), 3(5), May 1939, pp. 131-133, 2 tables.

Citellus richardsoni. Experimentally it was demonstrated that these animals are susceptible to the disease, and that ticks infesting them can carry enough of the virus to kill a guinea pig.

Diseases and Parasites: Fibroma

Honess, Ralph F. A freak deer head, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, p. 360, 2 pls.

Author's abstract: "Large multiple fibroma on head and neck."

Diseases and Parasites: Lead poisoning

Anon. New bird shot proposed to stop duck poisoning, Science News Letter (2101 Constitution Ave., N.W., Washington, D. C. 15 cents a copy), Sept. 2, 1939, p. 152.

Notice of a patent granted to R. L. Dowdell and R. G. Green of the University of Minnesota for a readily disintegrable shot, use of which would in time do away with the menace of lead poisoning to waterfowl. The proposed shot would consist of an alloy of lead with magnesium, barium, zinc, calcium, or sodium. To avoid disintegration in birds placed in cold storage, a thin coating of some other metal like copper or cadmium could be applied. The new shot is not commercially available.

Diseases and Parasites: Lead poisoning

Jones, John C. On the occurrence of lead shot in stomachs of North American Gruiformes, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 353-357, 2 tables.

Author's abstract: "A brief survey of literature on lead poisoning is followed by a report on the occurrence of lead shot in 1,977 stomachs of North American members of the Order Gruiformes. Two tables are given showing: occurrences, by months, of lead shot in the different species; and numbers of

pellets found in individual birds. Cranes, limpkins, and king, clapper, and Virginia rails were relatively unaffected and gallinules only slightly so, while sora and coots supplied most of the occurrences. Nearly half of the records came from soras, this species being apparently the only one to which lead shot represents a potential menace. Lead shot occurrence is far more prevalent in ducks, as shots were found in only 2.5 percent of all rail stomachs, while in ducks, records ranged from 9.5 for all species to as high as 75.5 percent for a single species."

Diseases and Parasites: Nematodes, frog

John, Everett E., and O. R. Causey. Two new nematodes (Filaroidea: Dipetalonematidae) from Rana sphenocephala, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 a section), 30(2), Sept. 1939, pp. 65-68, 6 figs.

Foleyella brachyoptera and F. dolichoptera from Florida described as new; key to 4 N. A. species of the genus.

Diseases and Parasites: Plague

Eskey, C. R. Recent developments in our knowledge of plague transmission, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 53(2), Jan. 1938, pp. 49-57.

Relative efficiency of various species of fleas as vectors; incidental mention of their hosts, including some wild rodents.

Diseases and Parasites: Plague

Eskey, C. R., and V. H. Haas. Plague in the western part of the United States, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 54(32), Aug. 11, 1939, pp. 1467-1481, tables.

Subtitle "Infection in rodents, experimental transmission by fleas, and inoculation tests for infection." Plague was first discovered among ground squirrels near San Francisco in 1900. It is now known in wild rodents of 9 western States, including localities east of the continental divide but not as yet in the Great Plains. Ground squirrels, prairie dogs, marmots, chipmunks, tree squirrels, wood rats, kangaroo rats, native mice, and rabbits are known to have been infected. Practically all of the fleas found on these animals are capable of transmitting plague. The species of fleas are named, their laboratory record as vectors tabulated, and other facts given as to their incubation and transmission of plague infection. Inoculation of guinea-pigs with the bodies of fleas collected from rodents is preferable to depending upon the discovery of plague-infected animals as a means for determining the existence of foci of infection. A footnote announces that the present paper is a resume of a comprehensive detailed report that is to be published as a Public Health Bulletin.

Diseases and Parasites: Plasmodium

Wetmore, Psyche M. A species of plasmodium from the sharp-tailed grouse infective to other birds, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 361-365, 1 pl., 2 tables.

Author's abstract: "Five canaries, three bob-whites, and two grouse were infected with a plasmodium isolated from Pediocoetes phasianellus campestris. This plasmodium produces 4 to 12 merozoites, displaces the cell nucleus of the natural host slightly when fully mature, and appears to have relatively little pathogenicity. A table of comparisons is given of this species with 4 others currently recognized as valid."

Diseases and Parasites: Rodent borne diseases

Gibbons, R. J. Survey of Rocky Mountain spotted fever and sylvatic plague in western Canada during 1938, Canadian Public Health Journ. (105 Bond St., Toronto 2, Canada. 35 cents a copy), 30(4), April 1939, pp. 184-187, 2 tables.

Examination of large numbers of specimens of both rodents and fleas collected in Alberta and British Columbia revealed no trace of the diseases mentioned. Several ticks were found to be infected with Bacillus tularense, the cause of tularemia in man.

Diseases and Parasites: Ticks

Cooley, R. A., and Glen M. Kohls. Ixodes marmotae. A new species of tick from marmots (Acarina: Ixodidae), U. S. Public Health Reports, 53(49), Dec. 1938, pp. 2174-2181, figs. (Separately published as Reprint 2011, 8 pp., figs., 1939. Supt. of Documents, Washington, D. C. 5 cents a copy.)

Segregation of the western counterpart of I. cookei; description, illustrations; type locality Idaho. Both forms attack man.

Diseases and Parasites: Tularemia

Francis, Edward. Sources of infection and seasonal incidence of tularaemia in man, U. S. Public Health Reports, 52(4), Jan. 1937, pp. 103-113. Reprint 1799 (Supt. of Documents, Washington, D. C. 5 cents a copy), 10 pp., 6 photos, 2 maps, 2 tables.

The history of tularemia is briefly stated, and its distribution described and mapped. The number of cases reported up to 1935, inclusive, is tabulated by years; the total was 6,174, deaths 299, mortality rate 4.8 percent. Wild rabbits and hares, tree squirrels, and about 10 other groups of wild mammals and birds, and one snake have been implicated in cases of the disease in man. More than 90 percent of the human cases come in one way or another from wild rabbits. In the Northeast a good many of the cases trace to rabbits

shipped from the west. Lesions in rabbits and man are described and illustrated. Symptoms in man, diagnosis, and prevention are discussed. Survival of an attack appears to confer permanent immunity.

Ecology: Carrying capacity

Grimm, Rudolf L. Northern Yellowstone winter range studies, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 295-306, 4 pls., tables.

Author's abstract: "Using protected and unprotected range chart plots in Yellowstone National Park, it was learned that 72.2% of the loss in plant density over a seven-year period was due to drouth and 27.8% to overgrazing. Sagebrush utilization plots in which one-half of the annual growth of each plant was clipped during October and the other half the following April showed that 28.5% of the annual growth of sagebrush (Artemisia tridentata) was utilized where the game population consisted chiefly of elks and that this utilization on areas stocked heavily with antelopes and deer as well as elks amounted to 81.3%, or nearly complete consumption of the annual growth. A range survey showed that 65% of this species of sagebrush had died primarily because of excessive utilization. Protected and unprotected plots of aspen, each 20 feet square, were charted over a period of 4 years in the case of two plots and for 3 years in that of another, and it was found that there was a 9.3% increase in the number of aspens in the protected, and of 42.7% in the unprotected, plots. The extent of the range available to the game animals during the winter periods, varying with the depth of snow, was mapped monthly over a 4-year period and the average number of forage acres available to the animals calculated. It was determined that the northern Yellowstone winter game range can support 7,334 elks in addition to the antelopes, deer, bighorn sheep, and buffaloes that also use it."

Ecology: Census methods, dove

McClure, H. Elliott. Cooing activity and censusing of the mourning dove, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 323-328, tables.

Author's abstract: "Cooing activity of mourning doves (Zenaidura macroura) at Lewis, Iowa, from March 26 to September 17, 1938, was recorded in 2,254 observations. Observations were made for five minutes at the end of each hour of the day. During this time the doves cooed an average of 20.4 times, 1.8 birds cooed, and there were 11.2 coos to a bird. Cooing was greatest in the early morning, least at midday, and increased again in the evening before sundown. Temperatures except below freezing and above 25° C. had little effect on cooing, but it decreased with increased cloudiness and wind speed. Cooing activity each day was nearly uniform from April through August. Using this information it is possible to census the doves in an area and a method and tables for doing it are given."

Ecology: Cover

Elton, Charles. On the nature of cover, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 332-338.

Author's abstract: "The great importance of cover in the protection and restoration of wildlife resources justifies greater attention to its place in the general protective system of the prey. Cover helps in protection not only from predators, but also from physical effects of weather, and from disturbance during mating activities. It may also in itself provide food. Analysis of the process of searching by a predator for its prey shows three main phases, in all of which cover is, or may be, important: (1) Random searching, in which the predator and prey are not in sensory contact, (2) pursuit, and (3) refuge. Owing to the variable part played by cover itself in these phases, it is more profitable to study the protective system of the prey as a whole. This includes: (1) The physical qualities and behavior of the prey, (2) of the predator, and (3) the qualities of the environment (vegetative and other cover, topography, surface conditions, state of atmosphere, night or day, and associated animals). These concepts are applicable also to the ecology of man, both as regards sport and war. The best method of measuring the effects of cover is by means of population counts and observations of the rate of contact established between the predator and its prey."

Ecology: Drainage operations

Anon. Needed--same program of ecology, Louisiana Conservation Review (Louisiana Dept. of Conservation, Civil Courts Bldg., New Orleans), Summer 1939, pp. 7, 58, 1 photo.

Undesirable effects of drainage of wildlife habitat illustrated by quotations relating to the Kankakee marsh, Indiana. Louisiana, while faced with the necessity of draining certain areas, should seek "a same middle course which will give x x x the benefits of reclamation and mosquito control and at the same time conserve the natural resources which are such a rich heritage for our people."

Ecology: Low temperatures vs. cottontails

Gerstell, Richard. The value of groundhog holes as winter retreats for rabbits, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, Pa. 10 cents a copy), 10(6), Sept. 1939, pp. 6-9, 3 figs., 3 tables.

A combined field and laboratory study which indicates that marmot burrows provide cottontails with dry, windless, even-temperatured retreats which admirably protect the rabbits from weather. Cottontails have less resistance to cold than do pheasants and it is believed that groundhog holes are highly beneficial to the bunnies.

Ecology: Populations, bird

Hickey, Joseph J. [Editor]. Bird-Lore's third breeding-bird census, Bird-Lore (1006 Fifth Ave., New York, N. Y. 30 cents a copy), 41(5), Sept.-Oct. 1939, Supplement, pp. 13-31.

Thirty-two reports mostly from the middle west, covering 4 types of environment: (1) bogs and marshes; (2) fields; (3) woodlands; and (4) man-made surroundings. The reports describe the areas concerned, indicate the degree of coverage, and present and discuss the censuses. The work seems of high grade throughout; it was participated in by some well known in the fields of ecology and wildlife management as well as in that of ornithology.

Education: Conservation

Palmer, E. Laurence. Conservation education in the schools, Nature Magazine (1214 Sixteenth St., N.W., Washington, D. C. 35 cents a copy), 32(9), Nov. 1939, pp. 509-516, 2 photos.

This second report on a study of conservation education carried on in cooperation between the American Nature Association and Cornell University begins by citing 6 publications that have already resulted from the investigation. The article then reviews legislative and other effort at conservation education in the States and refers to printed contributions to the subject. Suggestions are made as to the types of instruction suitable for the various grades of the public schools and as to organization of conservation materials for school use. The latter topic is treated in four ways with reference to systematic and ecologic groups, to man's interests, and to scientific principles. There is a bibliography including general reference materials, and publications useful in elementary, secondary, and collegiate schools.

Education: Conservation

Weaver, Richard Lee. Recent trends in conservation education, School Science and Mathematics (Central Assoc. of Science & Mathematics Teachers, Inc., 450 Ahmann St., Menasha, Wis. 35 cents a copy), 38(6), June 1938, pp. 647-653.

The depression has hurt conservation education as this subject was one of the first to be affected by retrenchment in expenditures. A great deal of work was necessary to bring it to the point once achieved and further effort will be required to restore and extend it. Game birds and mammals receive many times more consideration than non-game species and wild flowers. Can that situation be changed and how? Propaganda thrives far more than true education. Michigan has a well organized division of education and Florida, Wisconsin, and Oklahoma have passed laws requiring conservation education in public schools. One effort to get Federal legislation in this field has been defeated. Something along the line of the Smith-Hughes Act in support of vocational training, however, should be feasible. Adequate teacher training is a great need of the movement and lack of it may bring failure even where a promising beginning has been made. Cornell University is making a survey of the present status of conservation education with a view to aiding in its improvement.

Education: Conservation

Weaver, Richard Lee. Conservation education in some Federal and national agencies of the United States, Cornell University (Ithaca, N. Y.) abstracts of theses, 1939, pp. 116-120.

Part of the results of a study of conservation education; summary of activities of the Biological Survey, Extension Service, Forest Service, Soil Conservation Service, National Park Service, Office of Education, Civilian Conservation Corps, and national youth organizations. Author's conclusion: "Conservation education has been recognized as an essential part of most of the Federal and National programs. It is probably the strongest in the National Park Service, Extension Service, Soil Conservation Service, Forest Service, and Camp Fire Girls, Inc. It seems to need strengthening in the Office of Education, Civilian Conservation Corps, Boy Scouts of America, and Girl Scouts, Inc. Conservation education could be greatly facilitated in all the agencies by additional appropriations designed specifically for that purpose."

Education: 4-H clubs

Kottunen, A. G. How youth is learning to practice conservation, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(12), Aug.-Sept. 1939, pp. 3-4, 2 photos.

4-H Club activities, in forestry, soil conservation, pheasant propagation and management, deer-yard study, and individual projects relating to wildlife. Needs of the program are discussed. Associated notices in the same journal describe a conservation encampment, report on pheasant raising by "hundreds" of youths, propagation of raccoons, establishment and improvement of a waterfowl sanctuary, making shelters for birds, and other 4-H Club doings.

Food Habits: Algae eaten by waterfowl

Lynch, John J. Marine algae in food of Rhode Island waterfowl, Auk (Rudyard Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 374-380, 2 tables.

Marine algae are taken freely by the baldpate and black duck and to a lesser extent by the greater scaup. Algae are emergency foods and appear to be partially indigestible; specific identifications are given. Bibliography of 6 titles.

Food Habits: Bear, Black

Cottam, Clarence, A. L. Nelson, and Talbott E. Clarke. Notes on early winter food habits of the black bear in George Washington National Forest, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 310-314, 2 tables.

In mountainous sections of Virginia, the black bear persisted under hunting better than the white-tailed deer. Bears are reasonably numerous on the Forest named and there seems to be no reason why they cannot be perpetuated. Weights are given for two specimens (♀ 225 and ♂ 325 lbs.) and volume of stomach

contents for a like number (544 and 730 cc.). Twenty-five analyses are reported With the exception of rabbit remains in 2 stomachs and a little other animal food amounting to less than 1 percent of the stomach contents in which they occurred, all of the food was vegetable. Acorns, and fruits of blueberry, grape and tupelo are leading items.

Food Habits: Bud eating

Fryer, J. C. F. The destruction of buds of trees and shrubs by birds, British Birds (326 High Holborn, London, England. 1 shilling and 9 pence a copy), 33(4) Sept. 1939, pp. 90-94, Pl. 2.

Report on a restricted and carefully conducted questionary. Difficulty in making satisfactory observations was experienced possibly due to much of the bud eating being done at daybreak. Five species of birds are definitely implicated. From author's conclusion: "Apart from the Bullfinch and House-sparrow, the part played by the different species of bird in bud destruction is still undecided, and requires further investigation. The subject, however, is not easily dealt with, and the study is not without pitfalls, so that it is hardly appropriate to those who can only give it but casual attention."

Food Habits: Coyote

Hawbecker, Albert C. Coyotes prey on goats, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 371-372.

Definite records of 55, 76, and 317 goats being killed on ranches in Santa Cruz County, California, within a period of 2 years. A crippled and hence trap shy coyote never returned to a carcass but killed anew each time. Belled goats appear to be protected.

Food Habits: Coyote

Sperry, Charles C. Food habits of peg-leg coyotes, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 190-194, 2 figs.

Comparison of food habits as disclosed by analyses of 8,263 stomachs of normal, and 161 of trap crippled, coyotes. The latter animals feed more extensively upon carrion and livestock and are potentially and possibly actually a greater menace to domestic animals especially sheep and goats than are normal animals.

Food Habits: Deer damage

Anon. Michigan's deer damage problem, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(2), Nov. 1939, pp. 6, 7, 4 photos.

Has been increasing and this year was intensified by early frosts stopping wild growth and forcing the deer back onto alfalfa, corn, and garden produce. Deer cropping increases the extent of winter killing of alfalfa. A committee representing sporting and agricultural interests studied the situation and recommended the issuing of permits to kill deer in limited numbers where necessary to protect crops, and experimentation with fences, noise makers, repellents, and food patches as means of preventing or reducing damage. For the future, zoning and planning were recommended, which will operate to segregate chiefly recreational, from chiefly agricultural, areas.

Food Habits: Fish-eating birds

Cottam, Clarence, and C. S. Williams. Food and habits of some birds nesting on islands in Great Salt Lake, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(3), Sept. 1939, pp. 150-155.

Life history notes, and report on field observations and stomach and pellet analyses for the California gull, white pelican, great blue heron, and golden eagle. From authors' summary: "While fish-eating birds normally have rapid digestion, their nesting on islands 30 to 100 miles removed from their source of food supply suggests that they may have some mechanism for controlling the digestive organs and possibly also the rate of digestion. Young birds of Gunnison and Hat Islands that had just been fed by their parents were seen to regurgitate quantities of practically undigested food. The gulls seemed to be both scavengers and omnivorous feeders and disgorged undigested grasshoppers, garbage and fish, while pelicans seemed to be subsisting entirely upon non-game fish. Pellets and stomachs of herons showed that these birds had fed on ground squirrels, field mice, fish, young birds, insects, and plant fiber, while two large Golden Eagle pellets showed only the remains of muskrat." Bibliography of 7 titles.

Food Habits: Foxes

Chaddock, T. T. Report on grey and red fox stomach examinations, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(9), Sept. 1939, pp. 53-54.

Number of stomachs reported upon: Red fox 20; grey 113. Chief food in each case rabbits. Other items and the percentages of their occurrence listed.

Food Habits: Foxes

Hatfield, Donald M. Winter food habits of foxes in Minnesota, Journ. Mammalogy (Am. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 202-206, 2 tables.

Report on analyses of the stomach contents of 53 grey and 34 red foxes. Rabbits and mice were the predominant foods. Poultry and game birds were taken in larger proportion by the red than by the grey fox: 14:11.3 percent. All food items are tabulated and discussed. Popular claims as to great destruction of game birds are not substantiated.

Food Habits: Hawk, Marsh

Randall, Pierce E. Fall and winter food habits of the marsh hawk, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(7), Oct. 1939, pp. 12, 29, 4 tables.

Information obtained by analysis of pellets collected on an area in Lehigh County, Pa., where management studies of the ring-necked pheasant are in progress. The findings are tabulated for 4 seasons, early fall, late fall, winter, and periods of deep snow. In each, mice were the leading, and birds th second-ranking, article of diet; average percentage of occurrence, 78.7 and 13.6, respectively. No game birds were taken.

Food Habits: Pheasant, Amur

Loukashkin, A. S. The Amur ringed pheasant. An investigation into its natural food, The Field (Broom's Bldgs., London, E. C. 4, England. 1 shilling a copy), 173(4510), June 3, 1939, p. 1288, 2 photos.

This subspecies, Phasianus colchicus pallasi, of northern Manchuria live mainly in dense cover of hazel bushes and scrub oak which plants also are its principal sources of food. Fruits of Vaccinium, Crataegus, Malus, and Viburnum bulbs of Lilium, and seeds of legumes and grasses also are important. Insects and turtle eggs are prominent in the animal food. The bird lives also in culti vated districts where farm grains are much depended upon.

Food Habits: Poisonous plants

Thompson, Dave. Is there poison in your pasture?, The Prairie Farmer (1230 Washington Blvd., Chicago, Ill.), 111(16), Aug. 12, 1939, pp. 8, 21, 9 photos, 5 cartoons.

Descriptive notes and illustrations of 9 poisonous plants; also means of control and symptoms caused by eating them. Some are plants wildlife managers may use as black locust, wild cherry, and pokeweed.

Food Habits: Prairie dog

Kelso, Leon H. Food habits of prairie dogs, U. S. Dept. of Agriculture Circ. 529 (Supt. of Documents, Washington, D. C. 5 cents a copy), 15 pp., 4 tables, June (Sept.) 1939.

Review of literature (11 titles of which are cited) on the systematic an economic status of prairie dogs. Reports on analyses of 247 stomachs of the black-tailed, 169 of the white-tailed, and 127 of Gunnison, prairie dogs. The average food is almost entirely vegetable (97.47 percent) and consists largely of grasses, saltbushes, and other plants of value as forage for livestock. Other vegetation eaten includes weeds and certain plants poisonous to cattle. The animal matter taken consisted mostly of cutworms and grasshoppers. [The extent to which identifications were carried in these difficult analyses is gratifying, undetermined herbage averaging less than 2 percent for the 3 specie

Food Habits: Rabbit, European

Madsen, Holger. Does the rabbit chew the cud?, Nature (St. Martin's St., London, W. C. 2, England. 1 shilling a copy), 143(3632), June 10, 1939, pp. 981-982.

Morot in 1882 noted that the rabbit produces two sorts of feces, the first during the night--soft, mucous; the second during the day--pellet-like. The night feces are taken directly from the anus and swallowed by the animal, and Morot attributed the difference in consistency of the two sorts of feces to the food having passed once or twice through the alimentary canal. References are given to the original and 4 related papers. The author of the contribution here abstracted concludes from experiments that the phenomenon is due to an intestinal rhythm, but he emphasizes that rabbits are commonly known to be coprophageous. In discussion (pp. 982-983), E. L. Taylor confirms the regular occurrence of food pellets in rabbit stomachs and states that he has experimentally verified habitual coprophagy.

[The European rabbit is the basic stock for propagated and experimental rabbits and the findings noted have an important bearing on disease and dietary studies. The question arises whether native rabbits have similar habits that might be of great significance in disease transmission and cycles of decimation. An interesting related note on pouching of pellets by banner-tailed kangaroo rats may be consulted in the Journal of Mammalogy, 20(3), August 1939, pp. 378-379.]

Food Habits: Rodents vs. pine seeds

Tinsley, Selden L. Direct seeding--a revival, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(11), Nov. 1939, pp. 888-890.

Editor's abstract: "Since the large scale failure of direct seeding in the early days of forestry in the United States, artificial reforestation has been considered almost entirely in terms of planting. In this article the author protests the abandonment of direct seeding while still in its infancy and presents the results of experiments conducted to determine the factors affecting success and failure in direct seeding."

A good deal of failure of seedings of ponderosa pine is due to rodents but protective methods have some value and should be thoroughly tried out in view of the doubtful economy of raising and planting small trees. Reference is made to destructive activities of Columbian ground squirrels, field mice (Microtus montanus), and chipmunks. Idaho.

Food Habits: Russian olive, Utilization of

Van Dorsal, William R. Birds that feed on Russian olive, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 483-484.

Compilation of records mostly field observations of 9 species, together with a few less definite references. [The plant concerned, Elaeagnus angustifolia, is an introduced one of such wide tolerances that with the care usually extended in cultivation it will grow almost anywhere in the United States.]

Food Habits: Sanderling

Royal, Loyd A. Feeding habits of the sanderling at Copalis Beach, Washington, Murrelet (105 Anderson Hall, University of Washington, Seattle. 50 cents a copy), 20(2), May-August, 1939, p. 25.

Blamed for eating small razor clams the sanderling was proved guilty by the unanimous testimony of 33 stomach contents. Ten had been eating cockles, 9 terrestrial insects, and others gastropod egg cases, mussels, and fish.

Food Habits: Squirrel, Douglas's red

Adams, Lowell. Sierra chickaree eats young blue-fronted jays, Yosemite Nature Notes (Yosemite National Park, Calif.), 18(8), Aug. 1939, p. 93.

Field observation on Sciurus douglasii albolimbatus.

Food Habits: Squirrel, Gray

Torres, J. Kenneth. Gray squirrel utilization of elm, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 358-359.

Author's abstract: "Record of direct observations of gray squirrels feeding on the flower buds, flowers and samaras of Ulmus fulva and U. americana in spring during the past eight years in Pennsylvania and New York. Ulmus flower buds are taken in large quantities; one squirrel ate an estimated 100. Common usage of elm by gray squirrels in spring, indicates that this tree is an important food producer for them in the localities concerned."

Food Habits: Starling

Lindsey, Alton A. Food of the starling in central New York State, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(3), Sept. 1939, pp. 176-182, 1 fig., 2 tables.

Report on analyses of 1,268 stomachs, including 149 from nestlings. Author's summary: "It may be stated in summarizing the data on Starling food for central New York State that insects (identifiable at least to order) constitute about 35 percent of the material in adult stomachs, and 77 per cent in nestling stomachs. Vegetable matter makes up 41.4 per cent in adults and 4.9 per cent in nestlings, while mineral items are 0.8 per cent and 2.2 per cent, respectively. The remainder of the food in each case is animal matter other than insects, especially millipedes, unidentified animal matter, and animal garbage. Intensive work in central New York indicates that the economic status

of the Starling, as evidenced by analyses of stomach contents, does not differ fundamentally from that determined by Kalmbach and Gabrielson for six eastern States before this bird had attained its present numbers and distribution. The food habits are on the whole decidedly beneficial, especially in the case of the nestlings."

The author reports on the rate of feeding and growth of 2 broods, one of a single young and the other of 5 nestlings.

Food Habits: Turtle, Snapping

Self, J. Teague. Note on the food habits of Chelydra serpentina, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1938(4), Dec., p. 200.

Two taken near Norman, Oklahoma, had been feeding exclusively upon eggs of frogs.

Food Habits: Vulture, Black

McIlhenny, E. A. Feeding habits of black vulture, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 472-474.

Flocks killing and devouring skunks and opossums; also feeding on cattle dung. Louisiana.

Food Habits: Waterfowl

Munro, J. A. Food of ducks and coots at Swan Lake, British Columbia, Canadian Journ. Research (National Research Council of Canada, Ottawa. 25 cents a copy), 17, pp. 178-186, 4 tables, Aug. 1939.

Tabulation of numbers of 19 species of waterfowl observed on the lake 1932-38; description of lake; report on analyses of stomachs of 59 dabbling and 32 diving ducks, and of 45 coots, tabulated both as to frequency of occurrence and volume of food items. Furnishing cover, building material, and food for birds, mammals, and other organisms, bulrush (Scirpus occidentalis) is the most important plant in the economy of the lake. Chara is the most abundant submerged plant. Author's conclusions: "Observation of waterfowl at Swan lake, British Columbia, during a four-year period, and study of the stomach contents of 136 specimens, indicate that competition for food between ducks and coots during the autumn months is negligible. The branches of Chara form the chief food of coots; the oospores of the alga and to a lesser extent the branches are eaten by some species of duck. As this is the most abundant growth in the lake and is produced in unlimited quantities, there is sufficient for the requirements of a much greater coot and duck population than is ever likely to occur. It is probable that less than one per cent of the Chara crop is consumed by waterfowl. Seeds of Scirpus are most important in frequency of occurrence and percentage volume of duck food. Seeds of other aquatic plants and, to a lesser degree, molluscs and aquatic insects, also are eaten. These foods are inconspicuous items in the diet of coots."

Life Histories: Beaver

Erickson, Arrold B. Beaver populations in Pine County, Minnesota, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 195-201, 1 map.

Studies in St. Croix State Park and adjoining land appeared to warrant, in general, an estimate of 7 beavers per lodge. Beavers were nearly exterminated in Minnesota by 1900 but logging, removing little-used trees and increasing the stands of the much-used aspen, greatly augmented the potential beaver carrying capacity. On 70 percent of the study area, aspen was dominant and the beaver one of the most numerous mammals. The aspen supply is sufficient for maintenance of about the present population of beavers. The number of animals and the quantity of food available are discussed for the principal streams and ponds of the park and vicinity.

Life Histories: Beaver

Shadle, Albert R., and Thomas S. Austin. Fifteen months of beaver work at Allegany State Park, N. Y., Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 299-303, 1 map, 1 table.

Study of the work of introduced animals. Authors' summary: "The first year two adult beavers accomplished the following: (1) Cut 116 trees from 1 to 13 inches in diameter; (2) built two dams, each over 200 feet long and a total of 705 feet of dam; (3) constructed a house with a volume of approximately 472 cubic feet. During the three-month period from August 11 to November 11, 1938, two adult beavers and two kits accomplished the following: (4) Cut 150 additional trees from 1 to 15 inches in diameter, a grand total of 266 trees; (5) besides their other damming operations they built an additional 150 feet of dam and raised the height of the longest dam six inches along its entire length; (6) increased the volume of the house from 472 to 940 cubic feet; (7) collected and stored a winter's supply of branches. The pile measured 50 feet long, 8 fee wide, and 3 to 4 feet deep. Other points of importance were: (8) Ironwood (Carpinus caroliniana) made up nearly 9 percent of the number of trees cut, and Populus 71 percent; (9) the loss from improperly felled trees that lodged in standing trees was only 2.3 percent of all trees cut; (10) the order of preference of trees was: Poplar, willow, shadbush, ironwood, and pin cherry."

Life Histories: Cottontail

Allen, Durward L. Michigan cottontails in winter, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 307-332, 6 pls., tables.

Author's abstract: "A two-year study of the cottontail Sylvilagus floridanus mearnsii) was made on a 500-acre farm in Kalamazoo County, Michigan. In a series of 153 females, taken in December and January, the mean weight was 1,413.24 grams, and 168 males averaged 1,398.21 grams. In the entire series the mean was 1,406.37 ± 9.86. At the end of a severe winter a group of rabbits

averaged 48.8 grams less than a group taken the December before. Older rabbits were distinctly heavier than young of the year. The heaviest animal handled weighed 1,899 grams. The most important woody food plants were dwarf and staghorn sumacs (Rhus copallina and R. typhina), which were used intensively under conditions of deep snow. Upland and lowland brush containing ground holes and stands of artificially planted conifers were important cover types. There was a tendency for more male rabbits than females to be shot in the fall season, leaving a preponderance of females in the residual population. A study of individual ranges indicated that most rabbits occupied from 5 to 10 acres. There was no apparent 'territoriality' in winter. Staphylococcus albus, affecting the eyes, was the most important disease factor. Only 7.1% of a winter population were found to survive to a second winter, and only 2 of 228 animals are known to have survived to a third winter."

Life Histories: Coyote

Young, Stanley P. The coyote marches on, American Forests (919 Seventeenth St., N. W., Washington, D. C. 35 cents a copy), 45(11), Nov. 1939, pp. 538-540, 574-576, 6 photos, 1 map.

Crafty, cunning, and adaptable, the coyote, despite warfare against it, is holding its own and even extending its range. Formerly the animal was not found in the high ranges on western mountains but it occupies them now. The coyote in some localities has a migratory movement but most of its wanderings appear to be in response to food conditions. Notes are given on extension of range in the Pacific northwest, particularly in Alaska (map) and on sporadic occurrence (due to intentional or unintentional introduction) in the East. Life history, food habits, and economic status are sketched, and range in weight and susceptibility to rabies, mange, and tularemia also are briefly discussed.

Life Histories: Deer, White-tailed

Chapman, Floyd B. The white-tailed deer and its management in southeastern Ohio, Ohio Wildlife Research Sta. (Ohio State University, Columbus), Release 105, 10 pp., 2 figs., 1 table, mimeographed, Sept. 1939.

Deer, almost if not quite extirpated from Ohio by 1904, were reintroduced 1922-30 and have increased so that they now number more than 2,000, distributed in 31 counties. They are most closely related to the Southern white-tail (Odocoileus v. virginianus). The sex ratio is 4.3 does to 1 buck. The paper presents notes on age groups, antler growths and abscission, and mating period. There being no open season, poaching is the greatest cause of losses, with accidents and diseases next in order. The abundance of deer is roughly proportional to the amount of forest cover. Foods are listed and discussed; "the most important winter foods were chestnut-oak acorns, corn, apples, dogwood, hazelnut, mountain laurel, red maple, mountain sumac, blackberry, greenbrier, and orchard grass. Southern Ohio White-tails consume more grass in the spring than at other times. Broomsedge, hazelnut, dogwood, red maple, mountain sumac,

orchard grass, lambsquarter, rye, wild lettuce, bluegrass and the remaining acorns, are among the top-ranking spring foods." Water and salt requirements are commented upon and suggestions for management are given. Bibliography of 9 titles.

Life Histories: Gull, Herring

Dousing, Murl. The herring gulls of Hat Island, Wisconsin, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(3), Sept. 1939, pp. 170-173, 1 pl., 1 fig., 1 table.

Author's summary: "Among the Herring Gulls of Hat Island there was a definite territorial division of the breeding grounds. The young, at least until they were half-grown, were fed almost exclusively in these territories. The adult gulls were discriminating and fed only their own young. Territorial boundaries were protected by the adults by vigorous fighting. Trespassing young from neighboring territories were frequently killed in this defense of territory by an adult gull. Adult gulls made no attempt to rescue their own young which had strayed out of the home territory and were then attacked by other adults. The food brought in by adults consisted usually of fish but sometimes of quantities of small beetles."

Life Histories: Mole, Brewer's

Eadie, W. Robert. A contribution to the biology of Parascalops breweri, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 150-173, 2 pls., 3 figs., 4 tables.

Report on a 1935-38 study in the vicinity of Durham, N. H., involving about 100 collected specimens. Notes are given on variations in size, dentition, and coloration, scatology, molt, habitats, population, density (1.2 per acre), tunnels, nests, extent of range, periods of activity, locomotion, repair of tunnels, sanitation, social traits, parasites, predators, food (mainly earthworms and insects, the latter chiefly in immature stages), breeding habits, growth, life span (3-4 years), senses, and economic importance. Bibliography of 19 titles.

Life Histories: Mole, Brewer's

Hamilton, W. J., Jr. Activity of Brewer's mole (Parascalops breweri Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 307-309, 2 figs.

Albany County, New York. The simple field methods used in the study are described. "The records suggest that Parascalops exhibits no rhythmic activity such as is evident in Microtus (Hamilton, 1937) and Peromyscus (Johnson, 1926). This mole appears to be up and about at all hours, but it is apparently more active by day than by night. Probably predation is greatest at night, when the moles leave their burrows to capture the small nocturnal creatures which swarm on the forest floor as darkness falls." Bbiliography of 5 titles.

Life Histories: Pocket gopher

Dice, Lee R. Thomomys the engineer--friend or foe, American Forests (919 Seventeenth St., N.W., Washington, D. C. 35 cents a copy), 45(10), Oct. 1939, p. 512.

Reply to the article by Gabrielson abstracted in WILDLIFE REVIEW, No. 20, May 1939, p. 12. Dice quotes 4 Biological Survey naturalists to the effect that pocket gophers are not serious factors in causing soil erosion, and a former Forest Service man who places the blame for erosion of mountain meadows upon overgrazing. The role of predators in the situation is discussed and the need pointed out of making ecological investigations before control campaigns are adopted.

Life Histories: Prairie chicken, Attwater's

Lehmann, Valgene W. The heath hen of the South, Game, Fish and Oyster Commission (Austin, Texas. 5 cents a copy) Bul. 16, 11 pp., illus., July 1939.

Recognition of the subspecies, statement of its former and present range, tabulation of numbers (8,711) as ascertained in 1937, notes on breeding seasons and behavior, number of eggs (12 on the average), period of incubation (23-24 days), size of broods (average 5.48), juvenile mortality, post-breeding habits, food (about 85 percent vegetable), and limiting factors. The range of this species has shrunk more than 93 percent and the number of birds more than 99 percent in the past 75 years. Destruction of environment has been the most telling adverse factor and the only way of saving the subspecies is by acquisition and management of at least one, and preferably three, refuges each 10,000 acres in size in the best remaining range.

Life Histories: Robin

Schantz, William E. A detailed study of a family of robins, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(3), Sept. 1939, pp. 167-169, 5 tables.

Author's summary: "(1) The abnormally warm weather of March 1935 started the nesting season earlier than usual. The female selected the sites and built three nests without the aid of the male; (2) incubation began in all nests the evening following the depositing of the second egg and lasted for 12-1/2 to 13 days. The male did not cover the eggs or young at any time nor feed the incubating female; (3) the first egg of the first set was laid at 10:58 A.M., the second between 2 and 2:15 P.M. the following day; (4) one bird gave the food reaction when 6 minutes old; at 2-1/2 hours it peeped incessantly; (5) during incubation the female left the nest from 10 to 19 times a day, averaging 16.3 times. Forty periods on and off the nest averaged 44 minutes on and 11 minutes off (i.e. 80 per cent of daylight hours on the nest); (6) the male could see well in dim light, but the female could not; (7) for the first two days with both broods the young received between 81 and 84 meals per day; the third day they were given 89 and 90 meals, respectively. During the rest of the time the

first brood of 3 young received 82 to 99 meals per day and the second brood wit 4 young 92 to 113 meals; (8) the young left when 14 to 16 days old. One could not fly as far as 14 feet, while two flew 20 feet and another 33 feet; (9) one Robin 4 weeks old monopolized the bird bath, threatening adults of 3 species; (10) a nesting female often left her eggs and attacked a neighboring male as he carried food to his young." Columbus, Ohio.

Life Histories: Skunk

Jones, H. Walter, Jr. Winter studies of skunks in Pennsylvania, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 254-256.

In Delaware County the autumn peak population density is 31 per square mile. Family relationships and hibernation is discussed; there is probably no true hibernation in this area.

Life Histories: Sparrow, English

Weaver, Richard L. The northern distribution and status of the English sparrow in Canada, Canadian Field Naturalist (582 Mariposa Ave., Rockliffe Park, Ottawa, Canada. 25 cents a copy), 52(7), Oct. 1939, pp. 95-99, 1 map.

The northern boundary of range (mapped) seems fairly well settled, with only occasional new colonies attempting further extension. Definite migration has been observed at a few points but most movements are more wanderings in response to food conditions. The nesting season runs from mid-April to mid-August. It is generally conceded that numbers are decreasing. Damage is less than in former years and mostly results from competition for nesting sites with swallows and bluebirds.

Life Histories: Sparrow, Henslow's

Hyde, A. Sidney. The life history of Henslow's sparrow, Passerherbulus henslowi (Audubon), University of Michigan, Museum of Zoology (Ann Arbor) Misc. Publ. 41, 72 pp., 4 pls., 3 figs., 2 tables, July 1939.

A standard life history embodying results from personal studies and the literature, covering history of the species, its range, distribution, and migration, details of nesting and other habits, food, enemies, ectoparasites, plumages, and weights. Twelve pages of bibliography.

Life Histories: Squirrels

Zimmerman, F. R. Squirrels need management, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(10), Oct. 1939, pp. 40-45.

Notes on habitat and habits of gray and fox squirrels. Management suggestions are for regulation of lumbering so as to spare numerous food-producing trees, restriction of grazing, and provision of plenty of water.

Life Histories: Tern, Arctic

Pettingill, Olin S., Jr. History of one hundred nests of arctic tern, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 56(4), Oct. 1939, pp. 420-428, 2 tables.

Report of a study on Machias Seal Island, Maine, a site free from predators. Production, nevertheless, was kept down (23 fledged young resulting from 144 eggs) largely due to self-limiting factors inherent in the terns themselves. Losses are classified and tabulated and compared with those observed by Hagar in a Massachusetts colony of least terns. Bibliography of 8 titles.

Life Histories: Walrus

Collins, Grenold. Report on Pacific walrus (Odobenus divergens), U. S. Dept. of the Interior, Alaska Game Commission, Biological Survey (Washington, D. C.), 11 pp., mimeographed, Sept. 1939.

An interesting paper dealing with numbers, range, migration, breeding, appearance, weight, habits, and enemies of the walrus; utilization, methods of hunting, and annual kill (2,000 or less by natives) also are treated. Suggestions are given as to management and conservation, with which that made in the opening paragraph, "that the walrus is a very attractive game species from the standpoint of the big game hunter and sportsman," does not seem consistent.

Management: Attracting birds

McKenny, Margaret. Birds in a hedgerow, Bird-Lore (1006 Fifth Ave., New York, N. Y. 30 cents a copy), 41(5), Sept.-Oct. 1939, pp. 289-296, 4 photos.

Fruit-bearing shrubs and the birds they attract, in text and table, based largely on records of the Biological Survey.

Management: Attracting birds

Swigart, Mrs. H. M. How I attract birds to my garden and grounds, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(8), Aug. 1939, pp. 3-6.

Notes on fleshy and other fruit- and seed-bearers, and hummingbird flowers and the use of water, artificial cover, and feeding stations in attracting birds.

Management: Burning

Mahlenberg, W. G., S. W. Greene, and H. R. Reed. Effects of fire and cattle grazing on longleaf pine lands, as studied at McNeill, Mississippi, U. S. Dept. of Agriculture Tech. Bul. 683 (Supt. of Documents, Washington, D. C. 10 cents a copy), 52 pp., 5 pls., 10 figs., 15 tables, June 1939.

References to wildlife are slight but this publication will, nevertheless, be of interest to many wildlife managers not only for the experimental findings reported but also for its review of facts and opinions relative to burning revealed in the literature of which 66 titles are cited.

From authors' summary: "Annual winter burning maintained more favorabl composition, quality, and quantity of forage than did exclusion of fire. The smothering due to pine litter and accumulated dead grass retarded the growth o native grasses and legumes and reduced the number of plants per acre. The improvement in forage conditions through burning was reflected in the greater seasonal gains in weight of cattle on the burned area, which averaged 37 perce more than the gains made on the unburned pastures. The cattle secured their advantage in gains during the early part of the grazing season and held this advantage until removed from the area in the fall. The experimental pastures were grazed equally for about 7 months each year over a period of 11 years. Burning and grazing did not result in serious soil degradation. Burned-over soils exhibited slightly favorable chemical characteristics and unfavorable physical characteristics in comparison with unburned soils. The net effect on plant growth of favorable and unfavorable soil changes was not measured. Whil annual burning improved the forage conditions for cattle, the results indicate that successful regeneration of longleaf pine, especially where the brown spot disease is epidemic, may depend upon some system of periodic controlled burnin rather than the extremes of annual fires or fire exclusion, both found unsatisfactory in this study."

Management: Clearing

Ehrhart, E. O. An effective "tree dozer," Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(11), Nov. 1939, pp. 902-904, 5 figs.

Describes and illustrates attachment to bulldozer blade to put pressure on a tree at some height from the ground. Truck trails were built by the aid of this equipment at a cost of $88.72 per mile.

Management: Deer, Mule

Rasmussen, D. I. Utah's mule deer studies and management problems, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 28(5), Sept.-Oct. 1939, pp. 232-240, 6 photos.

In 1938 some 52,000 hunters purchased licenses to hunt deer in Utah, an they bagged from 25,000 to 30,000 bucks. On forest tracts especially studied, 65 percent of the deer hunters were successful. Protection has changed the status of the mule deer from that of a vanishing species in 1915 to one of abundance, including local overpopulations, in 1939. The Utah Wildlife Researc Unit was organized to study the deer situation and devise ways of maintaining optimum populations. Its research and extension activities are outlined. Studies of the sex ratio gave results varying from 1:2.5 to 1:3, indicating nothing wrong in this respect. Tagging proved that each deer herd is closely restricted to its range, usually a certain watershed. Competition between

livestock and deer, an important matter in a grazing region, is being carefully studied. It is worse on winter ranges where, however, conditions may be improved by purchase of lands for use of the deer. Feeding is expensive and otherwise undesirable. Winter losses are hardly to be cured by feeding or removal by trapping; herd regulation is a necessity.

Management: Farm game

Anon. A cooperative wildlife management program, Missouri Conservation Commission (Jefferson City, Mo.) Conservation Bul. 6, 20 pp., 1939.

Addressed to potential cooperators, this publication explains the Commission's objectives and outlines the extent of cooperation that body is prepared to offer. The bulletin discusses, also, refuges as part of a wildlife program, limitations of refuges, simple methods of improving environments for wildlife, and problems connected with harvesting the crop, tells how to organize a cooperative wildlife program, how to plan a wildlife management program, and comments on possible improvement in farmer-sportsman relationships. Bibliography of 18 titles.

Management: Farm game

Conklin, J. Gerd., and R. A. McCachran. Special wildlife refuge projects. How they may be established, Pennsylvania Game Commission, (Harrisburg), 12 pp., Aug. 1939.

With accompanying explanatory letter, and application and agreement forms, this pamphlet was prepared in furtherance of the farm game program, the history of which is given. The value of constructive programs for sportsmen's organizations is emphasized; under new legislation (quoted) such groups may now supplement State effort and promote, develop, and maintain refuges on privately owned land wherever the owners are willing. Definitions of terms, suggestions as to procedure, and form of agreement are given. Law enforcement is discussed. The projects are in every way distinct from the State Cooperative Farm-Game units and their success or failure depends upon the attitude and efforts of the sportsmen's groups concerned. The State Game Commission, however, will give aid and advice wherever it can.

Management: Forest wildlife

Buhler, Ernest O. A new way to use a community forest, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 37(11), Nov. 1939, pp. 901-902.

Multiple use including recreation, part of which is based on a pheasant propagating plant supported by a local sportsmen's organization and county officials. Onondaga County, N. Y.

Management: Forest wildlife

Montgomery, W. E. Forest management on State forests in its relation to wildlife, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(8), Nov. 1939, pp. 8-9, 27, 3 photos.

Diversity of groups interested in forests and of their reactions to forestry policies. Foresters have long been interested in game but have done little about it until definitely involved in multiple use programs by employme of CCC and other relief labor. Among modifications for the welfare of wildlif are blocking roads to discourage access to some areas, altering improvement cutting so as to spare food and cover, and building brush piles.

Management: Harvesting big game

Anon. Wyoming game utilization, Wyoming Wild Life (Wyoming Game and Fish Commission, Cheyenne), 4(8), Aug. 1939, pp. 1-2, 18-19, 1 table.

Take of big game discussed and tabulated in connection with estimates o the numbers of elk and deer on national forests for the year 1938. While modi fications in hunting regulations had been made in advance to facilitate reduc- tion of some of the well known overpopulations of certain big game ranges in the State, in only one forest did the kill exceed the estimated annual increas The combined yield of deer and elk for the areas involved was 1.16 per square mile. The dressed weight of the take of these 2 species was more than 2 milli pounds, equivalent to a year's consumption of all kinds of meat for the city o Cheyenne. The report notes various details as to distribution of the take, ag and weight of the animals, and hunting success. Overpopulation was scarcely remedied and doubling of the kill is recommended.

Management: Harvesting squirrels

Chapman, Floyd B. Controlled squirrel hunting on public lands in Ohio, 1938, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 101, 9 pp., 5 figs., 4 tables, April 1939.

Continuation of a series that has been noticed in previous issues of WILDLIFE REVIEW. This leaflet reports on the abundance of the gray squirrel in southern Ohio, upon ecological factors affecting the species, on hunter suc cess (1.3 squirrels per man), hunting pressure by days, crippling losses, sour of hunters (mostly local), and weights of the squirrels (average of 826 in 4 seasons 16.5 ounces). Bibliography of 21 titles.

Management: Herd regulation

Hamerstrom, F. N., Jr., and James Blake. Winter movements and winter foods of white-tailed deer in central Wisconsin, Journ. Mammalogy (Mn. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(2), May 1939, pp. 206-215, 2 figs., 1 table.

Description of the Central Wisconsin Game Project involving a hundred thousand acres, rather poor in both soils and vegetation. Deer number one to about 100-115 acres. Seasonal movements and food habits are discussed with special stress on those of the winter. Factors possibly responsible for concentrations at that time of year are considered. Winter foods are listed by groups according to their degree of utilization. There were some local shortages in food and loss of condition by the deer, but in general the food supply seems adequate to support the present herd. Regulation of the number of animals on certain areas, however, had better be done before trouble develops. Bibliography of 14 titles.

Management: Herd regulation, Kaibab

Johnson, Harlen G. Game management, Arizona Wildlife and Sportsman (125 N. Second Ave., Phoenix, Ariz. 15 cents a copy), 1(8), Aug. 1939, pp. 5, 9.

To maintain the proper numbers of animals, conserve or provide sufficient food and cover, and afford enough protection to bring about the desired balance, the wildlife manager needs much detailed information, most of which must be obtained by local research specifically planned to solve the problems presented. This thesis is illustrated by discussion of the management of Kaibab deer, for details of which see WILDLIFE REVIEW, No. 17, December 1938, p. 24. Favorite summer foods of the deer are aspen, snowberry, and rose; and winter preferences, cliffrose, purshia, and Brigham tea.

Management: Inventory

Hicks, Lawrence E. The 1938 September pheasant survey, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 116, 16 pp., 1 fig., tables, Aug. 1939.

Indicated average population in northwest Ohio, 102 birds per square mile. About 20 percent more birds could be seen in the morning than in the evening. Sex ratio of adults 45:55. Highway mortality 5.7 per 1,000 miles. There are remarks also on habitats frequented and difference between the sexes in this respect, on adult-juvenile ratio (about 3:7), proportion of hens rearing young (average 40 percent), age of juvenile birds (average 10.35 weeks), and size of broods (average 7). Notes are given also on rabbits, bob-whites, and Hungarian partridges. Technique of the survey and time required are stated.

Management: Inventory, deer, Michigan

Bartlett, I. H. Those controversial deer population figures, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(2), Nov. 1939, pp. 7, 10.

Estimates having proved unsatisfactory, the opportunity furnished by availability of CCC help was utilized to make actual counts on sample areas. Criteria used in selecting the plots, and methods of making the census drives are described. These have been in progress every year since 1935 and have

revealed an average population per square mile of 16.42 deer in the Upper, and 42.40 in the Lower, peninsulas. The total for the State is more than a million animals.

Management: Planting, nuts

Sedam, John. Nut trees a balance to wildlife, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(7), Oct. 1939, p. 5, 1 photo.

General article on utilization of nuts by wildlife and on the desirability of planting nut-bearing trees and shrubs.

Management: Planting for wildlife and erosion control

Mussler, Glenn E. Coralberry. Its value in erosion control, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(7), Oct. 1939, p. 5, 2 photos.

This plant which has several uses in erosion control, retains fruit through the winter that is known to be eaten by 9 species of birds.

Management: Refuges

Conklin, W. Gard. The Pymatuning State Game Refuge and Museum, Pennsylvania Game Commission Bul. 19 (Harrisburg, Pa., 10 cents a copy), 52 pp., 4 col. pl. and numerous halftones, 2 maps. Revised June 1939.

Revision of bulletin abstracted in WILDLIFE REVIEW, No. 16, November 1938, p. 30.

Management: Reindeer

Rachford, C. E., Frank H. Reeds, and I. D. Wilson. Report of the investigations of the Alaska Reindeer Committee, etc. Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, 76th Congress. First Session. Pt. II. 1939, pp. 571-619 (including discussion). Conservation in Conservation (919 Seventeenth St., N.W., Washington, D. C. 20 cents a copy), 5(4), July-Aug. 1939, pp. 20-23.

A tale of the white man blighting a native culture and belatedly attempting to make amends. "At one time caribou formed an important part of the Eskimo's diet and supplied him with much of his clothing and other needs. With the advent of firearms, the caribou were reduced to the point of extinction and were driven from the area." "Caribou meat ceased to be available about the same time as rifles and harpoons of whalers depleted the seal, whale, and walrus supply to a point where the natives were in danger of starvation." To remedy the situation, reindeer were introduced, 1892-1902, increased, and became indispensable to Eskimo economic life. Again white men intervened (1914) to make money out of reindeer. Herds were greatly increased and much pasturage ruined (reindeer moss requires 25 years to regenerate) but the depression ended

this adventure. Now the proposal is to buy up animals, and corrals and other equipment owned by non-natives, and manage the herds for the benefit of natives, with the hope of permanently improving their economic position. The Committee also recommends establishment of an experiment station to develop facts and technique for proper management of the reindeer. There are about 500,000 of the animals, of which about 320,000 are now owned by natives.

Management: Squirrel box

[Holtzapple, Raymond.] Squirrel box, Pennsylvania Game News, (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(8), November 1939, p. 30.

Drawing of box and suggested measurements. No doubt for gray squirrel; entrance diameter 2-1/2 inches. The box could be improved by binding the entrance hole with tin to protect it from gnawing.

Management: Transplanting beavers

Dahlen, Bernhard C. Beaver in Louisiana, Louisiana Conservation Review (Louisiana Dept. of Conservation, Civil Courts Bldg., New Orleans), Summer 1939, pp. 15-17, 8 photos.

Notes on habits, chiefly quoted, and on a program of live-trapping and transplanting the animals within the State.

Management: Trapping deer

Ruff, Frederick J. Trapping penned deer, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 288-294, 3 figs.

Author's abstract: "Eighteen Virginia white-tailed deer were trapped from a large enclosure by using a remotely controlled solid-walled chute, screened on top, that was about 14 feet long and was equipped at both ends with cloth-covered, hand-operated drop gates reinforced with hog wire. Several of the deer to be caught were carefully herded into this chute and subsequently removed by working them individually, first into a portable, tapered chute, and thence into a crate. The method of capture by patient herding indicates possibilities of trapping wild deer, for the semi-tame animals so caught were apparently little more amenable to driving than are wild deer." Cost very low, $2.63 per head.

Natural History: Alaska

Slattery, Harry. The problem of Alaskan development, U. S. Dept. of the Interior (Washington, D. C.), 94 pp. (mimeographed), July 1939.

Advantages and disadvantages of the Territory discussed. Wolves do not travel in large packs; there is a bounty on the animals of $20 per head, and not one has been killed in the Matanuska Valley in five years (p. 16). Fur-farming is a promising but relatively undeveloped industry (pp. 43, 49-50). Fur

processing could in part be done in Alaska, whereas at present practically all of the fur output, valued at nearly $3,000,000 in 1938, leaves as raw pelts (p. 44). Game as a basis for recreation is mentioned (pp. 45, 46). The bibliography includes 3 titles relating primarily to wildlife.

Natural History: Birds of Dallas County, Texas

Stillwell, Jerry E. Check list of birds of Dallas County, Texas, Dallas Ornithological Society (7460 San Benito Way, Dallas, Texas. $1.00 a copy), 3rd Edition, vii+83 pp., Aug. 1939.

A list of 456 birds of which 339 have actually been observed within the County, annotated, and well coordinated with current literature by the extensi system of footnotes. Bibliography of 39 titles and full index. There are tab lar keys to "white herons," "peep sandpipers," gulls, terns, "little olivaceou and other flycatchers," thrushes, "obscure warblers in fall plumage," meadowlarks, and "some adult sparrows."

Natural History: Birds of Grand Canyon

Bailey, Florence M. Among the birds in the Grand Canyon country, National Park Service (Supt. of Documents, Washington, D. C. 30 cents a copy), 211 pp., 124 figs., 1939.

Popular account, with field key, and check list; illustrated and indexe

Natural History: Birds of prey

Craighead, Frank, Jr., and John J. Craighead. Hawks in the hand. Adventures in photography and falconry. xiii+290 pp., 57 pls., Oct. 1939 (Houghton Mifflin Co., 2 Park St., Boston, Mass. $3.50 a copy).

Record of the experiences of the twin sons of a Department of Agricultu scientist in study and photography of birds of prey and in falconry. The illustrations are excellent and the accounts of birds interesting; the suggestions as to methods of photography will be of use to beginners in that art; those on falconry, it is to be hoped, will instill in recruits to the sport th conservation attitude and love of nature that characterize the authors.

Natural History: Deer

Cahalane, Victor H. Deer of the world, National Geographic Magazine (Hubbard Memorial Hall, Washington, D. C. 50 cents a copy), 76(4), Oct. 1939, pp. 463-510, 2 wash drawings and 16 colored plates by Walter A. Weber, 18 photos.

Popular general account of the family and essays on 25 species giving main points of interest about them; sumptuously illustrated.

Natural History: Frogs and toads

Burt, Charles E. The frogs and toads of the southeastern United States, Trans. Kns. Acad. Sci. (Manhattan, Kans.), 41, 1938, pp. 331-360.

Key and records and some systematic and descriptive notes. Bibliography of 3 pages.

Natural History: Game and fur animals of Alabama

Arant, Frank S. The status of game birds and mammals in Alabama, Alabama Dept. of Conservation (Montgomery), 38 pp., 18 maps, 2 tables, Sept. 1939.

Based mainly on a questionary, this report deals with the present distribution and abundance of 18 species of game and fur animals. One table rates 9 kinds of game according to the head taken and the number of hunters concerned; the bob-white and gray squirrel head the list with no close competitors. The accounts of species, each accompanied by a map showing occurrence and relative abundance, discuss former distribution, habits, economic value, game or fur status, and in some cases management.

Natural History: Herpetology of Kentucky

Wolter, Wilfred A., and Katherine Carr. Amphibians and reptiles of northeastern Kentucky, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1939(3), Sept., pp. 128-130.

Notes on 53 species.

Natural History: Herpetology of Oregon

Graf, William, Stanley G. Jewett, Jr., and Kenneth L. Gordon. Records of amphibians and reptiles from Oregon, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1939(2), July, pp. 101-104.

Notes on 35 species.

Natural History: Herpetology of Quebec

Trapido, Harold, and Robert T. Clausen. Amphibians and reptiles of eastern Quebec, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1938(3), Sept., pp. 117-125.

Annotated list of 16 species of amphibians and 5 of reptilians. Bibliography of 20 titles.

Natural History: Mammals, New York

Palmer, E. L., and Edna Drill. Teaching geography through the study of mammal distribution, Cornell Rural School Leaflet (Cornell University, Ithaca, N. Y.), 33(1), Sept. 1939, pp. 4-49, cover design, 29 figs., 25 maps.

Accounts of 32 species, rather detailed as to distribution, but including also notes on appearance, habits, food, and economic value; with numerous illustrations. It is of interest that 18 of the 25 distribution maps show transcontinental range for the species involved. The following figures for take in New York State, recording increase or decrease (in most cases during a ten-year period) are presented.

Take of certain mammals in New York State

Species	1927	1936
Opossum	1,086	2,908
Black bear	122 (1929)	68
Raccoon	40,908	26,921
Mink	9,612	5,608
Otter	1,135 (1928)	163
Skunk	120,002	42,669
Red fox	35,658	10,593
Gray fox	2,338	4,247
Muskrat	553,270	165,825
Cottontail	797,750	597,966

Natural History: Rattlesnakes

Klauber, Laurence M. A statistical study of the rattlesnakes, San Diego Soc. Nat. Hist. (San Diego, Calif.) Occasional Papers 5, 61 pp., 46 figs., 30 tables, Aug. 1939. (Lithoprint)

Part VI of a series of papers on rattlesnakes, this deals almost wholly with the fangs, treating in great detail their structure, growth, replacement, operating mechanism, and their variations as related to taxonomy.

Predators: On ducklings

Munro, J. A. The relation of loons, Holboell's grebes, and coots to duck populations, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 339-344, 2 tables.

The birds named have been charged with predation on ducklings of wild species in British Columbia, but tabulation of many observations on the size of broods reveals no correlation between reproductive success and the presence or absence of any or all of the alleged predators.

Propagation: Bob-white

Lescarboura, Austin C. American Forests (919 Seventeenth St., N.W., Washington, D. C. 35 cents a copy), 45(11), Nov. 1939, pp. 544-555, 566, 4 photos.

Popular account.

Propagation: Turkey

Barton, O. A. Turkeys. Origin, history, and distribution, North Dakota Agr. College (Fargo) Extension Service Circ. 167, 11 pp., 9 figs., 1 table, May 1939.

Definition and illustration of standard strains; however a good share of the circular is devoted to discussion of the history, distribution, and domestication of the wild turkey.

Propagation: Turkey

Marsden, Stanley J., and J. Holmes Martin. Turkey management, (The Interstate, Danville, Ill. $3.50 a copy), vi+708 pp., 137 figs., 1939.

This book, devoted primarily to the domesticated turkey, contains a chapter (2, pp. 14-24) on the classification, origin, and history of turkeys, much of which relates to wild birds. The wild turkey and its subspecies are further described as to appearance and habits on pp. 46-51. Chapters on propagation, feeds and feeding, and on diseases, parasites, and sanitation also may be of interest to wildlife managers. Specialized bibliographies are incorporated at the end of most of the chapters.

Research: Climbing method

McClure, H. Elliott. A method of tree climbing, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 329-331, 1 fig.

Author's abstract: "The standard method of climbing by tree experts is described. The observer uses a long rope and supports himself by means of a sling made of a double bowline and a sliding knot, the rolling hitch. By this aid he can safely climb about the tree and have his hands free for photography, measuring eggs, banding young, etc."

Research: Hair identification

Dearborn, Ned. Sections aid in identifying hair, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(3), Aug. 1939, pp. 346-348, 1 fig.

Illustrations of cross sections and medullary structures of guard hairs of 19 species of rodents and insectivores occurring in the northeastern United States, and suggestions as to their use in making identifications.

Research: Live-trapping and marking rabbits

Southern, H. N. A population study of wild rabbits, Quarterly Journ. Universities Federation for Animal Welfare (Gordon House, Gordon Square, London, W.C. 1, England. Sold only to members), July 1939, pp. 4-7.

Describes a method of repeatedly live-trapping European rabbits. The essentials of it are surrounding an infested area with a rabbit-proof fence and maintaining at several outlets tunnel traps functionable in either direction. The animals were marked with ear tags, the numbers on which can be read by the aid of a telescope of a power convenient in making other observations on the animals. The opening and closing paragraphs of the article contain reflections that can well be taken to heart on this side of the Atlantic.

"Of all the animals inhabiting the British Isles comparatively little is known of the mammals. This is especially remarkable in respect of the rabbit, since its ubiquity and powers of destruction make it so commonly talked about, and yet concerning its habits there exists a large body of ideas but very few supporting data."

"In conclusion the fact may be emphasized that we live among animals the whole of our lives, we affect their lives to a varying extent, we use them for our own purposes, even arrogate to ourselves the right to kill them, sometimes by not very humane methods, and at the same time we are appallingly ignorant of the very simplest facts about them, which should leave us very little cause for pride."

Research: Sexing sharp-tailed grouse

Manweiler, J. Combined weight class--rectrix pattern method for determining sex of sharp-tailed grouse, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 3(4), Oct. 1939, pp. 283-287, 1 fig., 1 table.

Author's abstract: "To eliminate the approximately 15 percent error resulting in sexing sharp-tailed grouse by the rectrix pattern, a weight-class table, representing 1,304 birds, is presented to determine the probable ratio of males to females by weights alone. A combination of both methods eliminates most possibilities of error. During periods of inclement weather, best exemplified by low temperatures, a compensatory weight adjustment is advisable. The paper applies to the Great Plains sharp-tailed grouse of the Lake States region."

Research: Trapping lizards

Rodgers, Thomas L. A lizard live trap, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1939(1), March, p. 51, 1 fig.

Of pitfall type; used with or without bait averaged one lizard a day.

Weights: Bear, Black

Gerstell, Richard. The growth and size of Pennsylvania black bears, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(8), Nov. 1939, pp. 4-7, 4 photos, 1 graph, 3 tables.

Notes on breeding season and gestation period and records of weights of cubs and adults. Fifty daily weighings of cubs reared in captivity and of the food they consumed are summarized and graphed. A table presents estimated range of weights for black bears from 10 to 70 months of age (extremes 30-80 and 255-350 lbs.). Heaviest Pennsylvania bear known weighed 633 pounds.

Weights: Deer, White-tailed

Hopkins, Ralph. Wisconsin's large deer of 1938, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(10), Oct. 1939, pp. 49-51, 1 photo, 3 tables.

Dressed weights indicating live weights in a few cases of more than 400 pounds. There is a table of average weights of deer of various age classes killed on national forests, and another of measurements of record heads.

ADDENDA

Classification: Rat, Kangaroo

Hall, E. Raymond, and Frederick H. Dale. Occasional Papers, Mus. Zool., Louisiana State University (University, La.), 4, 63 pp., 3 figs., 1 table, Nov. 1939.

General discussion of Dipodomys microps; citation of type, statement of range, diagnosis, comparisons, remarks, and list of specimens examined for 11 subspecies, 3 of which are described as new.

Diseases and Parasites: Chuckwalla

Conti, L. F., and J. H. Crowley. A new bacterial species isolated from the chuckwalla (Sauromalus varius), Journ. Bacteriology (Williams & Wilkins Co., Baltimore, Md.), 37(6), June 1939, pp. 647-653, 3 figs.

Authors' summary: "A new bacterium has been studied which is associated with a chronic disease in Sauromalus varius, characterized by tumor-like lesions of a rather slow evolution. The organism is a chromogenic, gram-negative, non-spore-forming, motile rod which has been temporarily classified as Bacterium sauromali."

Diseases and Parasites: Erysipelothrix

Waller, E. F. Erysipelothrix infection in a quail, Journ. Amer. Veterinary Med. Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 95(751), Oct. 1939, pp. 512-513.

Review of literature of which 7 titles are cited. Identification of the disease from a game farm quail in Iowa. Description of lesions and of laboratory procedure in determining the organism as Erysipelothrix rhusiopathiae. It is infectious to a variety of birds and also to domestic animals and man.

Diseases and Parasites: Thallitoxicosis

Larson, Charles P., Wm. N. Keller, and J. D. Manges. Accidental canine thallotoxicosis and dangers of thallium used as a rodenticidal agent, Journ. Amer. Veterinary Med. Assoc. (221 No. La Salle St., Chicago, Ill. 75 cents a copy), 95(751), Oct. 1939, pp. 486-489, 2 figs.

Depilatory and toxic effects, minimum lethal dose (15-25 mg. per kg. of body weight), symptoms of the poisoning in animals and man. Despite precaution use of thallium in rat control at the Western State Hospital, Fort Steilacoom, Washington, resulted in the death of "the majority of the pets on the hospital grounds." Case reports are given for 2 dogs. The authors conclude that "The use of thallium as a rodenticidal agent, even in the hands of an expert, is an extremely dangerous procedure, as it endangers both pets and children." Bibliography of 9 titles.

Diseases and Parasites: Ulcerative enteritis

Bass, Charles C. Observations on the specific cause and the nature of "quail disease" or ulcerative enteritis in quail, Maryland Conservationist (512 Munsey Bldg., Baltimore, Md.), Fall 1939, pp. 26-27.

Lists 10 species of gallinaceous birds in which the disease has been observed. Both the macro- and micro-scopic appearances of lesions are describe Technique for demonstrating a gram-negative, anaerobic bacillus abundant in the lesions. The author has transmitted the disease by 4 methods, one of which is use of pure cultures of the organism mentioned. Massive infections produced death in periods as short as 36 hours. On the other hand some infections may last for months, producing "carriers" that may give the disease to other birds. The suggestion is made that the infection may be transmitted through eggs.

Life Histories: Opossum

Coghill, G. E. Studies on rearing the opossum (Didelphys virginiana) Ohio Journ. Sci. (Bernard S. Meyer, Ohio State University, Columbus. 50 cents a copy), 39(5), Sept. 1939, pp. 239-249, 11 photos.

Description of pens and other equipment, and notes on appearance and behavior, especially of the very young. Bibliography of 9 titles.

Life Histories: Thrush, Song

Siivonen, Lauri. Zur Ökologie und Verbreitung der Singdrossel (Turdus ericetorum philomelos Brehm), Ann. Zool. Soc. Zool.-Bot. Fennicae Vanamo, 7(1), ix+ 285 pp., 42 figs., 10 maps, 24 tables, (Summary in Finnish, pp. 286-289), 1939.

A comprehensive, thoroughly organized, and well-documented report on a 1934-39 study of the ecology of the song thrush. Breeding and wintering ranges and migrations are discussed and mapped. In recent years the species has extended its nesting range northward and has remained in winter in areas previously unoccupied at that season. These phenomena are in accord with observed improvement in the north European climate. The breeding range lies mostly in pine- and spruce-clad regions but takes in some broad-leaved forests. It almost completely incloses the ranges of Picea excelsa, P. omorica, and P. orientalis and is well correlated also with the distribution of certain herbs. Abundance of the birds and size of their breeding territories varies greatly with the type of environment. Open spruce forests and mixed woods rich in spruces are most favorable, supporting up to 15-20 (and locally even 50) pairs per square kilometer (247.1 acres). Other environments, including areas modified by man, are described and rated.

The song thrush invariably has a definite breeding territory in which representatives of other species, even of thrushes but not of its own kind, are tolerated. The nest usually is in a dense spruce and the materials locally gathered often camouflage it effectively. Its height from the ground is mostly from 1-3 meters (highest 12 m.) and it is most frequently placed against a trunk or among thick branches where it is protected from rain. It is also well shaded, the average site being only about a third as well lighted as those chosen by the missel thrush. Materials and construction of the nest are described and illustrated. Variation in the number of eggs is thoroughly discussed, but little correlation with environmental factors is disclosed; the number of broods, however, increases from north to south. Incubation usually lasts 12-14 and brooding 13-14 days. Nest destruction varies with locality, being highest in the vicinity of man's dwellings; destroyers of eggs or nestlings include members of the crow family, especially jays and magpies, and in addition martens, weasels, dormice, snakes, ants, cats, and boys. The bird's songs are classified into five types that are discussed as affected by territory, breeding cycle, weather, intensity of light, and length of day.

In a section on nutritional biology, the author reviews the methods that have been used in studying and recording the food habits of birds and points out the desirability of making simultaneous investigations of available foods. He summarizes numerous earlier studies of the dietary of the song thrush and details the findings of his own researches, including both stomach analyses and field observations. The species consumes more animal food in the southern parts of its range and more wild fruits toward the north. Earthworms, snails, slugs, beetles, caterpillars, and ants are principal items of the animal diet, and fruits of Vaccinium, Ribes, Empetrum, Sorbus, and Juniperus leading articles in the vegetable subsistence. The food environment and feeding habits receive special attention, an interesting feature of behavior being the breaking of snails upon rocks that are habitually resorted to, the fragments of shells about these "anvils" conveniently indicating the bird's molluscan diet. The author inventoried available foods of sizes suitable for the song thrush in different types of environment at various seasons for the purpose of appraising utilization in relation to availability. But first he interposes results of a study of food preferences with caged thrushes from which he derives standards for an optimum diet. However the song thrush will substitute for the most relished foods others less preferred, especially when these are abundant and

readily obtainable. In other words, while the species has marked food preferences, they may be fully expressed only in the presence of all optimal foods. Preferences can be followed in many environments only so far as permitted by available supplies of which abundant sorts are likely to be most freely utilized. From his study of diet in relation to the kinds of food present, he concludes that both regional and seasonal variations in utilization of food are in direct correlation with variations in the available supply. This is an interesting confirmation of the importance of availability (cf. Smithsonian Misc. Coll. 85(7), 1932, pp. 135-136) but the intercalation of a theoretical optimum based on study of caged birds seems to add no strength to the hypothesis (cf. Proc. Acad. Nat. Sci. Philadelphia, 1912, pp. 356-364).

The author's term "optimal value of foods" appears to be only another way of expressing the familiar facts that birds are limited in their diets by their ecological ranges, by their sizes and capacities, and by their constitutional adaptations for collecting and utilizing certain types of food. Restricted by these dominating conditions, each kind of bird, as a rule, feeds in a more or less specific way in a limited environment, where in all likelihood the most plentiful edibles will be most freely consumed. This is the natural and practical thing, hence the rule. The bird may have preferences, but in the long run it is compelled by sheer pressure of circumstances to feed on available foods more or less in proportion to their abundance. The density of the song thrush population often seems to be in proportion to that of certain foods, as beetles, mollusks, and bilberries, but this principle does not operate to make the species as common in mature open deciduous woods, for instance, as it is in denser spruce forests, although the food supply may be equally great. The song thrush sometimes gets almost all of its food in a quite restricted part of its nesting territory, hence the author does not agree with Howard that quantity of food is decisive in fixing size of territory.

Concluding sections of the paper comprise a chapter on general behavior, a summary, and a 16-page bibliography.

WILDLIFE RESEARCH AND MANAGEMENT LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of the Interior, Washington, D. C.

BS-141. Protecting blueberries from damage by herring gulls, by Robert C. McClanahan, 4 pp., August 1939.

Habits of the gulls in Washington and Hancock Counties, Maine; damage to blueberries is restricted to a small minority of the gull population; control by frightening devices and modification of cultural practices.

BS-142. Big-game inventory of the United States, 11 pp., 17 tables, August 1939.

Second inventory based largely on estimates yet "far from satisfactory." In time trends may be reliably indicated. Notes on deer overpopulations, and

increase in their species in general as well as that of antelopes and black bears. Mountain sheep still decreasing. Tabulation of the estimates of 15 groups by States and according to land ownership and control. Also totals by States; grand total nearly 6 millions.

BS-143. Suggestions for the control of vagrant domestic pigeons, 4 pp., August 1939.

Status of pigeons as bearing on the legality of aggressive actions against them; suggestions for control by excluding, frightening, trapping, shooting, poisoning, and gassing.

BS-144. Raising deer in captivity, 6 pp., August 1939.

Enclosures and food requirements; notes on characteristics of white-tailed, mule, and black-tailed deer; list of valuable food plants; bibliography of 27 titles.

BS-145. Birdbanding, by Frederick C. Lincoln, 5 pp., October 1939.

Supersedes Leaflet BS-53 (1936). Notes on the history of birdbanding; organization in this country; qualifications of cooperators; suggestions as to avoiding injury to birds. description of bands and traps; and summary as to value of the work.

BIOLOGICAL BIBLIOGRAPHIES

Sporting magazines and conservation department organs

[Supplement; previous installments in WILDLIFE REVIEW No. 3, pp. 32-34, No. 4, p. 27, No. 7, pp. 30-31, and No. 12, p. 42.]

Of general scope

Ducks Unlimited. Quarterly, no price quoted. 500 Fifth Ave., New York, N. Y.

Fish & Game News Bulletin. Monthly, 75 cents a year. New Brunswick Fish and Game Protective Assoc., Fredericton, N. B., Canada.

The Sportsman. Monthly, no price quoted. 1134 H St., Fresno, Calif.

Of local scope

Arizona Wildlife and Sportsman. Monthly, $1.50 annually. Arizona Game Protective Assoc., 125 North Second Ave., Phoenix, Ariz.

Delaware Game and Fish News. Monthly, no price quoted. Board of Game and Fish Commissioners, Dover, Del.

Kansas Fish and Game. Monthly (mimeographed). Forestry Fish & Game Commission, Pratt, Kans.

Massachusetts Conservation Bulletin. Quarterly, no price quoted. Department of Conservation, Boston, Mass.

Bulletin of Massachusetts Fish & Game Association. Museum of Comparative Zoology, Cambridge, Mass.

Michigan Game Trails. Bi-weekly, 5 cents a copy. 214 Humber Bldg., Highland Park, Mich.

Minnesota Sportsman. Monthly, no price quoted. 1301 5th St. N. E., Minneapolis Minn.

Mississippi Game and Fish. Monthly, no price quoted. Mississippi Game and Fish Commission, Jackson, Miss.

The Missouri Conservationist. Quarterly, no price quoted. Missouri Conservation Commission, Jefferson City, Mo.

Missouri Wildlife. Monthly, 10 cents a copy. 5832 Charlotte St., Kansas City, Mo.

National Wildlife Federation Bulletin. Monthly, no price quoted. National Wildlife Federation, Investment Bldg., Washington, D. C.

The Northwest Conservationist. Quarterly, 15 cents a copy. 6224 25th Ave. N.E., Seattle, Wash.

Outdoor Iowa. Monthly (mimeographed). State Conservation Commission, Des Moines, Iowa.

Rocky Mountain Sportsman. Monthly, 15 cents a copy. Denver National Bldg., Denver, Colo.

Snohomish County Sportsman, Sulton, Wash.

Southwestern Sports Magazine. Monthly, 15 cents a copy. 214 North 6th St., Waco, Texas.

American periodicals relating to birds and mammals

[Supplement; previous installment in WILDLIFE REVIEW No. 4, pp. 27-29.]

Birds

Bird News. Monthly, $1.00 a year. L. R. Talbot, Old Concord Road, South Lincoln, Mass.

The Chat. Semi-monthly (mimeographed), single copy 25 cents. John H. Grey, Jr., 1719 Park Drive, Raleigh, N. C.

The Journal of Minnesota Ornithology. Annually, 10 cents a copy. The T. S. Roberts Ornithology Club, St. Cloud, Minn.

Bird Banding

Ebba Nus. Mimeographed. William Pepper, Jr., 110 Glenview Ave., Wyncote, Pa.

Biological journals

[Supplement; previous installment in WILDLIFE REVIEW No. 8, pp, 33-35.]

Of general scope

The American Journal of Pathology. Bi-monthly, $8.00 a year. 818 Harrison Ave., Boston, Mass.

American Journal of Physical Anthropology. Quarterly, $6.00 a year. Wistar Institute of Anatomy and Biology, Woodland Ave. and Thirty-sixth St., Philadelphia, Pa.

The Journal of Comparative Neurology. Bi-monthly, $7.50 a year. Wistar Institute of Anatomy and Biology, Woodland Ave. and Thirty-sixth St., Philadelphia, Pa.

The Journal of Nutrition. Monthly, $5.00 a year. Wistar Institute of Anatomy and Biology, Woodland Ave. and Thirty-sixth St., Philadelphia, Pa.

Physiological Zoology. Quarterly, $7.50 a year, single copy $2.25. The University of Chicago Press, 5750 Ellis Ave., Chicago, Ill.

Of local scope

New England Naturalist. Quarterly, 25 cents a copy. 234 Berkeley St., Boston, Mass.

Institutional and societal publications, excluding those of Academies of Science

[Supplement; previous installment in WILDLIFE REVIEW No. 8, pp. 36-37.]

University of Arizona Biological Science Bulletin. Semi-quarterly, no price quoted. Tucson, Ariz.

University of California Publications in Zoology. Issued irregularly, parts variously priced. University of California Press, Berkeley, Calif.

Bulletin Natural History Survey. Issued irregularly, no price quoted. Urbana, Ill.

Indiana University Publications Science Series. Issued irregularly, no price quoted. Bloomington, Ind.

Iowa State College of Agriculture and Mechanic Arts Research Bulletin. Issued irregularly, no price quoted. Ames, Iowa.

University of Iowa Studies. Semi-monthly, no price quoted. Iowa City, Iowa.

Kansas University Science Bulletin. Semi-monthly from January to June and monthly from July to December, no price quoted. University of Kansas, Lawrence, Kans.

University of Michigan School of Forestry and Conservation Bulletin. Issued irregularly, single copies variously priced. Ann Arbor, Mich.

Publications of the University of Oklahoma Biological Survey. Quarterly, parts variously priced. University of Oklahoma Press, Norman, Okla.

Roosevelt Wild Life Annals. Quarterly, $5.00 a year, single copy $1.25. New York State College of Forestry, Syracuse, N. Y.

Roosevelt Wild Life Bulletin. Quarterly, $4.00 a year, single copy $1.00. New York State College of Forestry, Syracuse, N. Y.

NOTES AND NEWS

Federal Aid to the States in Wildlife Restoration.--From July 1 to October 21, 63 projects in 30 States were approved by the Biological Survey, 23 of them involving research, 25 being for development, and 15 for acquisition of game management areas.

Aleutian Islands Wildlife Refuge.--Based on field investigations in recent years on this 1,000-mile stretch of islands totaling 3,000,000 acres in area, comprehensive regulations have been issued by the Secretary of the Department of the Interior to control the blue fox industry and destruction by the foxes of colonial birds of the islands, to protect the fauna in general, and to provide economic independence for the native Aleuts. Enforcement of the regulations will be entrusted to the crew of the Brown Bear, a patrol boat adequate for continuous service in the difficult seas of the region.

The National Park Service is preparing a multilithed bulletin on the basis of the 1939 wildlife census in national parks and monuments. The bulletin will give brief accounts of conditions in all major parks and monuments, statistics on birds and mammals, and a discussion of the bear-visitor problem. Copies may be obtained by writing to the Wildlife Division, National Park Service, Department of the Interior, Washington, D. C.

It should perhaps be explained that the comment at the top of page 28, No. 22 of WILDLIFE REVIEW, was in criticism only of a popularized account of the 10-year quail study in Columbia Co. (Prairie du Sac), Wisconsin. Errington, himself, has long recognized a connection between his findings and the older thesis of proportional predation (Ecology, 15:110-127, 1934; Condor, 37:230-232, 1935); the chief differences he points out relate to thresholds of comparative security of wintering bob-whites from, and vulnerability of overpopulations to, predation in north-central States.

"Abstracts of papers presented at Wildlife Conservation Short Course. May 4, 5, 6, 1939" (University of Minnesota, Dept. of Agriculture, 54 pp., mimeographed). Obtainable, so long as the supply lasts, from Prof. Gustav Swanson, University Farm, St. Paul, Minn.

The nature of the sections relating to wildlife (other than fishes) is here briefly indicated.

Anon. "The wildlife program of the U. S. Soil Conservation Service," pp. 1-4.

Use of vegetation suitable for erosion control in ways that will benefit wildlife particularly on the so-called waste areas on farms.

Fenstermacher, R. "Diseases affecting moose," pp. 5-6.

Caused by ticks, eyeworms, lungworms, flukes, tapeworms, roundworms, and the bacterium Brucella.

Green, R. G. "Diseases of wild animals and birds," pp. 7-8.

Possibilities of combating lead poisoning by the use of shot made from a readily disintegrable alloy. Even if knowledge of wildlife maladies, as the shock disease of the snowshoe hare, does not promise control, yet it may lead to improved management of the animals. Understanding wildlife diseases transmissible to man, as tularemia, is necessary in safeguarding human health. Pseudotuberculosis in various animals and distemper in foxes also are mentioned.

Gillham, C. E. "Waterfowl problems in Minnesota," pp. 9-10.

The need still is for waterfowl to populate northern breeding grounds. Refuge areas are being planted but in time they would develop suitable vegetation by natural processes. While we must go ahead as best we can in practical ways, research in every direction is needed.

Fredine, Gordon. "Farmer-sportsman relationships," pp. 11-14.

Minnesota has a rich and varied stock of game and much public land open to hunting. The number of hunters is growing, however, and cannot be fully accommodated by public shooting grounds. Farmers not originally opposed to hunting on their lands become so due to trespass nuisances. "No hunting" signs are most numerous near centers of population. Outline of methods of harmonizing farmer-sportsman relationships that have been effective in Michigan, Ohio, and other States.

Aldous, Shaler E. "Minnesota big game animals," pp. 15-18.

Minnesota's original 10 big game species have now been reduced to 5, two of which also have been nearly or quite extirpated and then reintroduced. Brief history of each of the species with comment on the existing population, if any. White-tailed deer numbered about 335,000 in 1937 and were worth at least $10 each. The herd could withstand a harvest of 25,000 to 30,000 animals per year, yielding nearly a 10 percent return on the "capital" value.

Anderson, Parker O. "Planting trees and shrubs on farms for wild life," pp. 19-22.

General suggestions relative to planting; lists of cover, browse, mast, fruit, and seed producers; and notes on kinds of wildlife utilizing numerous trees and shrubs.

Elkins, Winston A. "The deer problem in the national forests," pp. 23-25.
The deer population should be held at about the carrying capacity of the range, regulated hunting being the most obvious means. Some areas are too inaccessible for hunting to be an important factor and there predators can be beneficial. Permitting overpopulation, starvation, and destruction of range is wasteful mismanagement. Live-trapping, too expensive for general use, is applicable in special cases. With the population at a reasonable level, habitat improvement, especially of winter range, may be attempted. New winter yards can be created although at considerable expense.

Roberts, Thomas S. "The value of song birds," pp. 34-35.
About a billion birds make their homes in, or visit, Minnesota each year. They have great importance for good or harm; illustrations of both tendencies are cited.

Breckenridge, W. J. "Reptiles and amphibians of Minnesota," pp. 36-40.
Comment on superstitions relative to these animals. Characteristics and habits of the groups and summary of Minnesota representations of them.

Swanson, Gustav. "Upland game birds," pp. 41-44.
Comment on about a dozen species, 5 introduced, of which the pheasant is now the most important game bird of the State. Factors which are responsible for the supremacy of the pheasant include: High rate of reproduction, marked resistance to unfavorable elements of the environment, polygamy, ability to escape hunters, and adaptability to artificial propagation.

Manweiler, J. "Minnesota fur-bearers and problems of using them properly," pp. 49-54.
Definitions of "fur-bearers," and of "wildlife management." This is an industry that should be carried on like farming but which can utilize marginal lands. Sound management requires inventory, census, and control of populations. The history of fur-bearers has been one of constant decline in numbers. Minnesota fur animals comprise 22 species, of which the beaver, marten, fisher, and otter have had legal protection in recent years. Estimated numbers and values by species for the period 1930-37 are presented in a table. Harvest is not properly regulated but suggestions are given, particularly with reference to beavers.

"Now legislation enacted this year provides that in the future Wisconsin will pay for damage done by bears as well as deer. The legislation follows many claims during the last few years as to bear damage to beehives, sheep, calves, and pigs. The problem of bear damage is also a serious question in the neighboring State of Michigan. A recent statement by the Michigan Conservation Department says: 'The legislature in its recent session, eyeing bills for bear damage totalling more than $5,000, approved payment but voted to remove the animals from the protected list. The legislature qualified its action, however, in authorizing the commission to restore protection to bears in any county.'" (Wisconsin Conservation Bulletin, 4(10), Oct. 1939, p. 15.)

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WILDLIFE REVIEW

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SPECIAL NOTICES

No complete sets of WILDLIFE REVIEW are available, and no complete runs (i.e. index and the issues indexed), except the last--Nos. 18-24, inclusive.

Copies of back issues will be thankfully received. They may enable us to fill the sets of libraries or other inquirers. Please address to WILDLIFE REVIEW, Biological Survey, Department of the Interior, Washington, D. C.

Requests for the publications abstracted, other than Wildlife Research and Management (RS) Leaflets, should be sent, not to the Biological Survey, but to the address given in the bibliographic citation to the particular paper desired.

Readers are urged to send separates of, or references to, articles which they think should be abstracted in WILDLIFE REVIEW.

Exchange with related periodicals is invited.

Washington, D. C. No. 25 December, 1939

SUBJECT INDEX FOR WILDLIFE REVIEW
Nos. 19-24, April-November 1939

The classification used in the index is primarily from the wildlife management point of view, major headings being much the same as have been regularly used in WILDLIFE REVIEW. Subordinate grouping depends usually on the key word, which may be preceded by a preposition, article, or other trivial term. Federal agencies are arranged alphabetically under U. S. Government.

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19	April 1939	110	103	--	--	--
20	May 1939	101	104	--	--	--
21	May 1939	97	88	1	--	9
22	August 1939	124	135	1	--	5
23	October 1939	79	91	5	--	--
24	November 1939	161	166	--	4	6
Totals		672	557*	7	4	20

* Duplications deducted.

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WILDLIFE REVIEW

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Washington, D. C. No. 26 February, 1940

Bibliography: Filing wildlife literature

Yeager, Lee E. Subjects for filing wildlife literature, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 44-54, 1 fig., 1 table.

Author's abstract: "The author's system of indexing wildlife literatur is described. This is essentially a flexible, related-subject arrangement of about 400 headings under five main divisions of the literature, which are General, Organizational, Specific, Management, and Basic Research. As a filin policy, references are placed as specifically as possible, and a simple cross reference card system is used for citations which could be placed under two or more subjects. Discussed are several indexing systems for references and reprints, together with various helps used by the author. Filing mechanics, difficulties of file making for field workers, the convenience of clear, descriptive titles, and the desirability of developing a standard system for indexing wildlife literature are treated briefly. The complete list of filing subjects is given."

Bibliography: Zoology of Tennessee

Shoup, Charles S. An annotated bibliography of the zoology of Tennessee and the Tennessee Valley region, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 21(3), May 1939, pp. 585-686.

Classified according to phyla of animals and provided with a locality index.

Biological Survey: Annual Report, 1938-39

Gabrielson, Ira N. Report of the Chief of the Bureau of Biological Survey 1939 (Supt. of Documents, Washington, D. C. 15 cents a copy), 75 pp., 6 tables, December 20, 1939.

The last of a series of 54 annual reports under the Department of Agriculture. Features deemed of special interest are functioning of The Federal Aid to Wildlife Restoration Act, continued rapid progress of the Federal wildlife refuge program, and establishment of the Patuxent Research Refuge. Numerous other activities are reviewed in brief paragraphs and the operations of the Bureau are summarized by subjects including, investigations of migrator waterfowl, birdbanding, and wildlife researches including those of the Federal State cooperative units and those on economic investigations, fur animals, and disease and rodent control. Federal Aid in Wildlife Restoration is again treated with a tabulation of approved projects, showing their locations and purposes. Acquisition of more than 2,000,000 acres of refuge lands is shown i a table giving localities and project designations. The restoration of refuge areas by Federal works agencies and their biological development are described Several new and numerous older refuges and ranges are briefly discussed, especially as to their utilization by wildlife. The report includes also sections on the enforcement of conservation laws, on importations of mammals and birds, on predator and rodent control, and on wildlife conservation in Alaska.

pleasure may be derived from keeping these animals in suitably confined areas, their maintenance in a wild state in a farming district calls for a higher sacrafice from the agricultural community than the latter can possibly be expected to make. Tenants have in fact in several instances threatened to give up their farms, if steps were not taken to reduce the numbers of the vagrant deer." The control method recommended is shooting, but done selectively, by a few persons, rather than by drives.

Control: Deer repellent

Weiss, Siegfried. A simple deer repellent for conifer plantations, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 77-79, 2 tables.

Cowdung, 5 parts, hydrated lime 1 part, plus enough water to make a thin plaster applied to terminals rather effectively protected them and did not in itself injure the buds.

Control: Rats

Fallowfield, John. Declaration of war on rats, The Field (114 Fleet St., London, E.C. 4, England. 1 shilling a copy), 174(4531), Oct. 28, 1939, p. 849, 1 photo.

With food conservation a necessity in Great Britain, rat control is a national duty. Each rat is estimated to cost the country one pound ($4.86) a year. "Under the Rats and Mice Destruction Act of 1919 all occupiers of premises are expected to control these rodents, but the law is seldom enforced." "One of the most serious things is the fact that the Black rat is spreading fast and is exterminating the Common or Brown rat." Being a better climber, it is not so amenable to rat-proof construction as is the Brown rat. Damage preventive steps are outlined and also aggressive control measures including poisoning with red squill, etc., and gassing. "Farmers should encourage all the animals and birds that help to keep down rats and mice." Owls, hawks, foxes, stoats, and domestic cats are mentioned.

Control: Wolf

Roberts, B. G. The tricks of trapping wolves, Forest and Outdoors (610 Canada Cement Bldg., Montreal, Canada), 35(11), Nov. 1939, pp. 340-341, 1 photo.

Suggestions as to type and care of traps, scent posts, and the making of sets.

Destruction: Highway mortality, Michigan

Martin, Russell J. Highway toll, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(3), Dec. 1939, p. 2.

General remarks, records by two State employes, and estimates of probable mortality in the State. Care urged.

Destruction: Highway mortality, Texas

Davis, William B. Mortality of wildlife on a Texas highway, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 90-91, 1 table.

Ten months records of mammals found dead along 6 miles of concrete highway in Brazos County indicated an average mortality of nearly 10 per mile-year. Extending this figure over the mileage of fast highways in the State gives an estimate of nearly 157,000 mammals killed annually; probable mortality on unimproved roads (40 percent as great) would bring the figure to nearly 180,000. This is for mammals alone; birds suffered less but reptiles more.

Diseases and Parasites: Acarina, Amblyomma

Cooley, R. A., and Glen M. Kohls. Amblyomma philipi--a new tick from Texas and Mexico, with a key to known species of Amblyomma in the United States (Acarina: Ixodidae), U. S. Public Health Service Rep. 54(2), Jan. 1939, pp. 44-47, 2 pls. Reprint 2023, 4 pp., 2 pls. (Supt. of Documents, Washington, D. C. 5 cents a copy).

The title is almost an abstract. The ticks described were collected from cottontails, jack rabbits, and coyotes. Separate keys are presented for the males and females of 6 species of Amblyomma.

Diseases and Parasites: Acarina, Dermacentor

Cooley, R. A. The genera Dermacentor and Otocentor (Ixodidae) in the United States, with studies in variation, U. S. Public Health Service, National Institute of Health Bul. 171 (Supt. of Documents, Washington, D. C. $1.25 a copy), 89 pp., 30 pls., 3 figs. 1938.

A systematic monograph, introduced by a general account of these ticks and their role as vectors of diseases. Descriptive terms are defined and illustrated, and the method of measuring the ticks is explained. The history and synonymy of the genus is given as well as key to adults and nymphs. The specific accounts include synonymy; description and illustration of sexes, nymphs, and larvae; records of hosts; and statement of distribution (with map). There is a colored plate, besides other illustrations showing males and females of each species. The genus Otocentor is described as new; type species Dermacentor nitens ranging from Texas to northern South America.

Diseases and Parasites: Acarina, Eutonyssus

Hubbard, C. Eugene. Eutonyssus ewingi n. sp. an ophidian lung mite, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 21(3), May 1939, pp. 657-662, 1 pl.

From rattlesnake in Oklahoma; description, illustration, comparative notes.

Diseases and Parasites: Algal poisoning

Doem, A. W., and Frank Thorp, Jr. Toxic algae in Colorado, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 95(752), Nov. 1939, pp. 542-544, 1 photo, 1 table.

Mortality among tame ducks at a lake in Weld County, Colo, instigated this study which took botulism into consideration but, nevertheless, led to the conclusion that true algal poisoning had occurred. The alga was identified as Anabaena flos-aquae. Wild birds were found dead about the lake.

Diseases and Parasites: Anaplasmosis

Stiles, Geo. W. Anaplasmosis in cattle, U. S. Dept. of Agriculture Circular 154 (Supt. of Documents, Washington, D. C. 5 cents a copy), 10 pp., 3 figs., revised December 1939.

Nature of the disease, its geographical distribution, symptoms, lesions, diagnosis, and treatment. The publication cited here because the malady is reported to affect the antelope and buffalo.

Diseases and Parasites: Aspergillosis

Durant, A. J., and Elvis R. Doll. Pulmonary aspergillosis in a skunk, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 95(752), Nov. 1939, pp. 645-646, 2 photos.

One skunk of a litter of 5 reared by a cat died from aspergillosis. Lesions are described.

Diseases and Parasites: Avian malaria

Manwell, Reginald D., and Frederick Goldstein. Strain immunity in avian malaria, Amer. Journ. Hygiene (Prince and Lemon Streets, Lancaster, Pa. $2.50 a copy; single number of any section $1.00), 30(3), Nov. 1939, pp. 115-122, 3 tables.

Experiments with six strains of Plasmodium circumflexum derived from wild birds showed that although immunity was strain specific, it conferred at least partial protection against other strains. Bibliography of 18 titles.

Diseases and Parasites: Cestoda, Choanotaenia

Lincicome, David R. A new tapeworm, Choanotaenia iola, from the robin, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(3), June 1939, pp. 203-206, 1 pl., 1 fig., 1 table.

From Illinois; description, illustrations, measurements, comparative notes; redefinition of the family Dilepididae.

Diseases and Parasites: Cestoda, Hymenolepis

Schultz, Richard L. Hymenolepis scalopi n. sp., American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 21(3), May 1939, pp. 641-645, 1 pl.

From moles in Oklahoma; description, illustration, comparative notes. Bibliography of 9 titles.

Diseases and Parasites: Cestoda, Schizotaenia

Olsen, O. Wilford. Schizotaeniasis in muskrats, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(3), June 1939, p. 279.

Tapeworms from muskrat compared with those from porcupine; this the fir report of the genus in the muskrat which, in view of all circumstances, appear to be an accidental rather than a normal host.

Diseases and Parasites: Coccidiosis

Appling, Phillip. Control of coccidiosis in the chukar, Game Breede and Sportsman (205 E. 42nd St., New York, N. Y. 25 cents a copy), 43(11), Nov. 1939, p. 165, 1 photo.

Symptoms and means of distribution of the disease; milk mash treatment; recommendation of 5 preventive measures as follows: "(1) Allow no moist place in the brooder pens; (2) change the old water fountain for a sterilized one twice a day. We sterilized them by turning them up to the sun for a few hours (3) use contamination proof feeders that will not spill feed on the ground; (4 go over dropping accumulations daily with a firekill torch; (5) use some sort fly-killing device to reduce the number of flies, or screen them out entirely.

Diseases and Parasites: Coccidiosis

Ormsbee, Richard A. Field studies on coccidiosis in the ring-neck pheasants of eastern Washington, Parasitology (Cambridge University Press, 200 Euston Road, London, N.W. 1, England (18 shillings and sixpence a copy), 31(3), Sept. 1939, pp. 389-399, Pl. 11, 2 tables.

Methods of the study are described. A section on taxonomy includes descriptions (with figures) of one previously described, two new, and one undetermined species of Eimeria. A table gives comparative data for them. Th total average incidence of all species of coccidia was 38 percent; representation of the parasites was reduced in winter. All infections observed were lig and apparently had little pathological significance. The effect of temperatur upon oocysts and sporulation is discussed. Bibliography of 29 titles.

Diseases and Parasites: Of cottontail, Iowa

Morgan, B. B., and E. F. Waller. A survey of the parasites of the Iowa cottontail (Sylvilagus floridanus mearnsi), Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 21-26.

Authors' abstract: "All of the 210 Iowa cottontails examined during 1938-39 harbored at least one, and some as many as seven, species of coccidia. Three species were reported as new for North America. Sarcocystis cuniculi was present in approximately 10% of the rabbits. Cittotaenia variabilis and Taenia pisiformis (larva) were the only cestodes and Hasstilesia tricolor the only trematode identified. The nematodes found were: Trichuris leporis, Trichostrongylus calcaratus, Obeliscoides cuniculi, and Nematodirus leporis. Three species of fleas, Cediopsylla simplex, Hoplopsyllus affinis, and Ctenocephalides canis, and one species of tick, Haemaphysalis leporis-palustris, were identified."

Diseases and Parasites: Distemper

Green, R. G., and C. A. Evans. Rapid diagnosis of canine distemper, Cornell Veterinarian (Cornell University, Ithaca, N. Y.), 29(1), Jan. 1939, pp. 35-40, 1 pl.

Canine distemper affects also foxes, minks, and ferrets in captivity. The method described is examination of stained smears from the epithelium of the bladder. Bibliography of 14 titles. See abstract of a companion article in WILDLIFE REVIEW No. 22, August 1939, p. 8.

Diseases and Parasites: Leukoencephalitis

King, Lester S. Moose encephalitis, Amer. Journ. Pathology (818 Harrison Ave., Boston, Mass.), 15(4), July 1939, pp. 445-454, Pls. 74-75.

Symptoms, lesions, and seasonal distribution of the disease now known from Maine and Minnesota. Bibliography of 17 titles.

Diseases and Parasites: Mange in squirrels

Payne, Ernest A. The return of the California gray squirrel, Yosemite Nature Notes (Yosemite National Park, Calif.), 19(1), Jan. 1940, pp. 1-3, 2 figs.

Mange caused by mites of the genus Notoedres first noticed in California in 1917 spread rapidly and greatly reduced the numbers of gray squirrels. By 1926 they were nearly exterminated throughout the Yosemite area. Now the population is definitely on the increase. Competition with the red squirrel or Sierra chickaree is discussed.

Diseases and Parasites: Nematoda, Dispharynx

Olsen, O. Wilford. Dispharynx pipilionis, a new spiruroid nematode from the red-eyed towhee, American Midland Naturalist (Notre Dame, Indiana), 21(2), March 1939, pp. 472-475, 1 pl.

Description and illustration of a new species from Pipilo e. erythrophthalmus from Kentucky. A key to 13 species of the genus (with host records) is given.

Diseases and Parasites: Nematoda, Rictularia

Cuckler, Ashton C. Rictularia onychomis n. sp. (Nematoda: Thelaziidae) from the grasshopper mouse, Onychomys leucogaster (Wied.), Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(5), Oct. 1939, pp. 431-435, 1 pl.

Key to 24 species of the genus, 1 from Nebraska described (and illustrated) as new. Bibliography of 19 titles.

Diseases and Parasites: Nematoda, Spirocerca

Hill, William C. Spirocerca longispiculata n. sp., American Midland Naturalist (Notre Dame, Indiana. $1.00 a copy), 21(3), May 1939, pp. 636-640, 1 pl.

From opossums collected in Oklahoma; description, illustration, comparative notes. Key to 4 species of the genus. Bibliography of 7 titles.

Diseases and Parasites: Protozoa, Haemobartonella

Tyzzer, Ernest Edward, and David Weinman. Haemobartonella n. g. (Bartonella olim pro parte), H. microti n. sp., of the field vole, Microtus pennsylvanicus, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $2.50 a copy; single number of any section $1.00), 30(3), Nov. 1939, pp. 141-157, 1 pl., 2 figs., 2 tables.

Seven different types of blood parasites have been observed in the common field vole; morphological and biological characters are treated for one of them here described as new from Massachusetts; comparisons with other micro-organisms known from the blood of mice; tests of susceptibility to infection with deer mice and laboratory animals were negative. Bibliography of 28 titles.

Diseases and Parasites: Protozoa, Haemoproteus

Coatney, G. Robert, and Evaline Yost. Studies on Haemoproteus sacharovi of mourning doves and pigeons, with notes on H. maccallumi, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $2.50 a copy), 31(1) C, Jan. 1940, pp. 9-14, Pl. 1.

The two forms named in the title though morphologically similar are apparently physiologically different; both were found in the blood of young mourning doves in Nebraska. Notes on their characteristics and development in captive pigeons. Bibliography of 13 titles.

Diseases and Parasites: Protozoa, Hexamita

McNeil, E., E. D. Platt, and W. R. Hinshaw. Hexamita sp. from quail and from chukar partridges, Cornell Veterinarian (Ithaca, N. Y.), 29(3), July 1939, pp. 330-333.

Report of this parasite in Valley and Gambel's quails and in the chukar partridge on California game farms. Description of the parasites and of the pathological conditions with which they were associated. Notes on experimental transmission. Summary of previous records from birds; bibliography of 9 titles.

Diseases and Parasites: Psittacosis

Lazarus, Alfred S., and K. F. Meyer. The virus of psittacosis, Journ. Bacteriology (Williams and Wilkins Co., Baltimore, Md.), 38(2), Aug. 1939. I. Propagation and developmental cycle in the egg membrane, purification, and concentration, pp. 121-151, 5 tables; II. Centrifugation, filtration, and measurement of particle size, pp. 153-169, 4 tables; III. Serological investigations, pp. 171-198, 3 figs., 5 tables.

Report on highly technical laboratory investigations with extensive bibliography. For the general reader, the most significant conclusion is that the virus of psittacosis acts in all respects as a small microörganism requiring an intracellular habitat for survival and multiplication.

Diseases and Parasites: Of Sciuridae

Katz, J. S. An annotated bibliography of references concerning parasites of squirrels (Family, Sciuridae), Ohio Wildlife Research Station (Columbus) Release 131, 21 pp., mimeographed, Dec. 1939.

This leaflet contains an abstract of the author's thesis on Parasites of Ohio Squirrels with a bibliography of 15 titles. This is followed by an annotated list of 82 publications referring to parasites of all members of the family Sciuridae.

Diseases and Parasites: Shock disease

Green, R. G., C. L. Larson, and J. F. Bell. Shock disease as the cause of the periodic decimation of the snowshoe hare, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $2.50 a copy; single number of any section $1.00), 30(3), Nov. 1939, pp. 83-102, 2 figs., 6 tables.

Summary of knowledge of cycles in snowshoe hares; review of concepts as to cause; no significant variation found in rate of reproduction in relation to the cycle; statistics on hare populations of the study area of the authors in

Minnesota (number per square dropped from 473 in 1933 to 32 in 1938); effects predators on cycles (not controlling); discussion of infectious diseases and parasites in relation to the die-off in which all but shock-disease are eliminated as causes; report on studies of this malady in field and laboratory, as symptoms, lesions, and cause; "it is our conclusion that this disease of undetermined etiology is the mortality factor that brings about the periodic decimation of the snowshoe hare." Bibliography of 24 titles.

Diseases and Parasites: Siphonaptera, Opisodasys

Jellison, Wm. L. Opisodasys Jordan 1933, a genus of Siphonaptera, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(5), Oct. 1939, pp. 413-420, 3 pls.

Comparative descriptions, illustrations, and records of hosts (rodents) 5 North American species all known. Bibliography of 9 titles.

Diseases and Parasites: Of skunk

Stegeman, LeRoy C. Some parasites and pathological conditions of the skunk (Mephitis mephitis nigra) in central New York, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(4), Nov. 1939, pp. 493-496.

Notes on lice, fleas, ticks, mites, and cestodes, and on miscellaneous pathological conditions, one of which is due to a worm (Filaroides mustelarum).

Diseases and Parasites: Trematoda, Brachylaemus

Harkema, Reinard. A new species of Brachylaemus from the barred owl, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(3), June 1939, p. 277, 1 fig.

From North Carolina; description, illustration; comparative notes.

Diseases and Parasites: Trematoda, Gorgoderina

Rankin, John S., Jr. The life cycle of the frog bladder fluke, American Midland Naturalist (Notre Dame, Indiana), 21(2), March 1939, pp. 476-488, 2 pls.

Review of literature of bladder flukes in amphibians, 26 titles of which are cited. Description of methods, experiments, stages in the life history (illustrated) of Gorgoderina attenuata, the intermediate host of which is a small bivalve (Sphaerium).

Diseases and Parasites: Trematoda, Halipegus

Thomas, Lyell J. Life cycle of a fluke, Halipegus eccentricus n.sp found in the ears of frogs, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(3), June 1939, pp. 207-221, 2 pls.

From Rana spp. Michigan; description of the new species, and all of its stages, illustrated; report on experimental infections; bibliography of 18 titles.

Diseases and Parasites: Trematoda, Opisthorchis

Wallace, F. G., and Lawrence R. Penner. A new liver fluke of the genus Opisthorchis, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(5), Oct. 1939, pp. 437-440, 1 fig.

O. tonkae n. sp. described from Minnesota muskrats; illustration and comparative notes. Bibliography of 8 titles.

Diseases and Parasites: Trematoda, Prosthogonimus

Gower, W. Carl. Infectivity of Prosthogonimus macrorchis Macy for the common ring-necked pheasant, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(5), Oct. 1939, pp. 447-448.

Tests by feeding probably infected dragonfly nymphs indicated the pheasant to be a refractory host to this fluke.

Diseases and Parasites: Trematoda, Psilostomum

Beaver, Paul C. The morphology and life history of Psilostomum ondatrae Price, 1931 (Trematoda: Psilostomidae), Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(5), Oct. 1939, pp. 383-393, 1 pl.

Description and illustration of the various stages and record of hosts, which include the muskrat and a number of birds. Life histories of this and related forms. Bibliography of 6 titles.

Diseases and Parasites: Trematoda, Tamerlania

Penner, Lawrence R. Tamerlania melospizae n. sp. (Trematoda: Eucotylidae) with notes on the genus, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(5), Oct. 1939, pp. 421-424, 1 fig.

Previous records of parasites of the family and their hosts; history and diagnosis of the genus; key to 5 species, one new, which is described and figured; host, Lincoln's sparrow; locality Minnesota. Bibliography of 10 titles.

Diseases and Parasites: Trematodes of Tennessee

Harwood, Paul D. Notes on Tennessee helminths. IV. North American trematodes of the subfamily Notocotylinae, Journ. Tenn. Acad. Sci. (Dr. J.T. McGill, Vanderbilt University, Nashville, Tenn. 50 cents a copy), 14(3), 1939, pp. 332-340; 14(4), 1939, pp. 421-437, 1 pl.

Review of records of members of the subfamily in this country; they are mostly from waterfowl or shore birds. Diagnoses, keys, and descriptions, including those of a new subfamily, one new genus, Hofmonostomum, and 6 new species. Bibliography of 40 titles. A monograph of the subfamily.

Diseases and Parasites: Of turtles

Wieczorowski, Elsie. Parasitic lesions in turtles, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 25(5), Oct. 1939, pp. 395-399, 1 pl.

Role of parasites in causing neoplasms; helminths found in 20 Chrysemys from Wisconsin; description and illustration of lesions. Bibliography of 9 titles.

Diseases and Parasites: Virus diseases

Beach, J. R., Chairman. Poultry diseases, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 95(752), Nov. 1939, pp. 613-622.

Includes a conspectus and a bibliography (101 titles) of 21 virus diseases applying to wild birds as well as to poultry.

Ecology: Availability seasons Tennessee game foods

Wing, Leonard. Availability seasons of some Tennessee game-food plants, Journ. Tennessee Acad. Sci. (Dr. J. T. McGill, Vanderbilt University, Nashville, Tenn. 50 cents a copy), 13(4), 1939, pp. 325-327.

Notes for the vicinity of Norris, Tennessee, for 32 groups of plants. Some comment on utilization: beech probably the most valuable mast tree; flowering dogwood and dwarf sumac among the most important food-bearing plants of the region.

Ecology: Brood counts, waterfowl

Travis, Bernard V. Duck brood counts in Iowa during the summer of 1935, Iowa Bird Life (Winthrop, Iowa. 25 cents a copy), 9(4), pp. 46-50, 3 photos, 1 table.

Observations made on 17 bodies of water are summarized and tabulated; 107 broods of 6 species were counted. "The average number of ducklings in a brood for each of the species was: Blue-winged teal 5.9, mallard 6.8, shoveler 5.8, pintail 6.9, ruddy 4.7, and redhead 3.0."

Ecology: Census methods, beaver

Atwater, M. M. South Fork (Montana) beaver survey: 1939, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 100-103, 1 table.

Censuses to determine present, and indicate potential, beaver populations were carried on; representative results are tabulated. With good management the number of animals could be doubled; poaching is the greatest drain.

Ecology: Census methods, prairie chicken

Davison, Verne E. An 8-year census of lesser prairie chickens, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 55-62, 6 figs.

Counts of males on "gobbling grounds" were made from an automobile in early morning during the breeding seasons of 8 years, 1932-36, 1938-39. The actual numbers counted are tabulated and a variety of computations of them are given to demonstrate relative reliability of the estimates. "The minimum area to be censused as representative of a range is indicated as 2 x 2 miles square (2,540 acres) but the results from areas 3 x 3 or 4 x 4 miles square are more dependable. The 4 x 4 mile tract (10,360 acres) can be censused in 5 or 6 days using about 3 hours each day."

Ecology: Census methods, small mammals

Bole, B. P., Jr. The quadrat method of studying small mammal populations, Cleveland Museum of Nat. Hist. (Cleveland, Ohio) Sci. Publ. 5(4), pp. 15-77, 3 figs., 14 tables, Dec. 1939.

Review of methods, especially that of quadrats for estimating small mammal populations; discussion of actual use of the quadrat method by workers of the Cleveland Museum; and results of studies of population of 18 species. The author's conclusions are that:

"(1) The quadrat method provides an accurate means of determining small mammal abundances.

"(2) In general, the larger the quadrat the more accurate the results, and that quadrats 150 feet or 50 meters on a side or circular units of corresponding area are still small enough to be easily operated and are large enough to provide a high degree of accuracy, and hence should be considered the standard sizes for population investigations of mammals whose home ranges are of the same size or smaller than that of the quadrat.

"(3) The use of shelter-belts or outer tiers of quadrats about a central one is not justifiable because of the tremendous labor involved if the quadrat is maintained at standard size, because the belts themselves cause population disturbances within the quadrat, and because the data the belts yield can be put to better statistical use if the traps that furnished them are part of the quadrat itself.

"(4) More than one quadrat should be used in any given community, but should be placed no closer to each other on forests than 300 yards, and no closer than 100 yards in fields.

"(5) All parts of a quadrat must be ecologically uniform and similar to the larger area which it is meant to represent, if figures on populations for one particular habitat are desired.

"(6) A three-day trapping limit should be set, as the resident population is practically exhausted in this time.

"(7) Trapping within a quadrat must be thorough and executed with the sole purpose in mind of getting all the mammals out of it as swiftly as possible, for which reason traps should be set in underground or surface underways or wherever the mammals are, and should not be set at regular intervals within the quadrat, since the lairs and runways do not so arrange themselves in nature.

"(8) The use of insulated quadrats is futile as the metal sheeting used will cause spectacular changes in the ecological picture of the quadrat, particularly if moles are part of the small mammal fauna.

"(9) The use of very small quadrats (smaller than 100 feet on a side) is indefensible owing to the relatively high percentage of animals drifting into them from adjacent terrain.

"(10) Quadrats are found to be particularly useful in studying cyclical changes in small mammal populations and in collecting the less common species of a given small-mammal fauna."

Bibliography of 29 titles.

Ecology: Census methods, white-tailed deer

Erickson, Arnold B. Notes on a method for censusing white-tailed deer in the spring and summer, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 15-18.

Author's abstract: "In 1937 a method was developed for censusing spring and summer deer populations in the Lake States (Minnesota). In this cruising method the following factors were controlling: the distance between cruising lines, density of cover, running distance, flushing distance, sight distance, cover visibility, type of cover, and sex and age of the deer. Observations on 38 deer flushed in the St. Croix Park, Minnesota, yielded the following information: average flushing distance 140 feet; running distance 70 feet to over a quarter of a mile; cover visibility for aspen (Populus tremuloides) types averaged 100 feet. In 18 of 38 observations deer were flushed from aspen types; the sex of 22 of the 38 deer flushed was determined--10 male, 12 female. By the use of the formula $P=\frac{A}{X}\frac{Z}{Y}$ where A is the total area; P the population; Z the number of deer flushed; X the miles of line cruised; and Y the average flushing distance, the deer population on 27,900 acres was calculated at 557.12 head or 12.78 per square mile or 50 acres per head."

Ecology: Census methods, wildlife

Grater, Russell K. Taking a wildlife census, National Park Service Region III (Santa Fe, N. Mex.) Quarterly, 1(2), Oct. 1939, pp. 17-21, 1 pl.

Notes on methods used for elk, deer, bighorn, antelope, moose, burro, and beaver. Censuses are useful and the making of them interesting.

Ecology: Fire effects

Hanson, Herbert C. Fire in land use and management, American Midland Naturalist (Notre Dame, Indiana. $1.00 a copy), 21(2), March 1939, pp. 415-434, 2 tables.

A discussion of the ecological effects of fire dealing slightly with only its injurious relations to wildlife. Of value to all wishing to consider the subject as a whole and especially for its extensive bibliography.

Ecology: Impoundments

Saugstad, Stanley. Effect of artificial pounds on our duck population, North Dakota Agr. Expt. Sta. (Fargo) Bimonthly Bul., 2(2), Nov. 1939, pp. 6-8, 2 photos.

During recent years more than 4,000 dams have been built in North Dakota. Few, however, of the ponds formed have attracted nesting waterfowl. The chief reason seems to be unsuitable marginal vegetation, a situation that in time will be remedied by natural processes, if grazing is controlled.

Ecology: Pheasant, ruffed grouse

Gould, Ernest W. Progress report of the Southern New Hampshire Pheasant Demonstration and Research Project, New Hampshire Fish and Game Dept. (Concord), 10 pp., tables, mimeographed, Dec. 1939.

Summary of work done and results obtained during the first year of a project under Federal Aid to the States in Wildlife Restoration. As in the other case reported on by Gould (abstracted p. 38), pheasants were released on a tract where food and cover were inadequate. Losses were, accordingly, heavy; The population fell from 112 in May to 19 in September; causes are analyzed. A table of mortality by cover types is interesting but could be interpreted better if the populations of the different types were known. The range of a single brood studied increased steadily week by week. The acreage of cover types included in 4 brood and 6 adult territories is tabulated. Nearly 1,800 fruit-bearing shrubs and trees were planted with 62 percent survival. The seed mixtures, rate of fertilizing, liming, and seeding are listed for 9 food patches; the average cost per acre was $25.24; average cost per 100 pounds of food produced $3.38. Nineteen thousand conifers to improve cover were planted at a labor cost of $6.34 per M. The report includes also life history notes upon ruffed grouse and on a supplementary pheasant study on farm land.

Ecology: Salt marsh

Taylor, Norman. Salt tolerance of Long Island salt marsh plants, New York State Museum (Albany) Circular 23, 42 pp., 19 figs., tables, Nov. 1939.

Report on field and laboratory studies of salt tolerances of 11 species. In general the plants were found to thrive in considerably fresher water than that to which they are usually exposed in nature. Tolerances being so wide, the author concludes that the effect of ditching salt marshes as a limiting factor on the plants is not what some assume it to be. His work indicates that it is of minor importance in changing vegetation.

Economics: Bats, Texas

Osborne, Ray. Bats are big aid to landowner, Monthly Bulletin Texas Game, Fish, and Oyster Commission (Austin), 3(1), Dec. 1939, p. 5.

Interesting notes on the life histories of Texas bats, and figures for guano production of several caves; from 20 to 70 tons are yielded annually by some of them; value of the guano $35 per ton.

Economics: Bird banding

Dodge, Natt N. Economics of bird banding, National Park Service Region III (Santa Fe, N. Mex.) Quarterly, 2(1), Jan. 1940, pp. 14-22, 1 pl.

Popular account of the need of conservation, economic importance of birds, history and results of bird banding, and cooperation of the National Park Service in the work. Bibliography of 13 titles.

Education: Conservation, review of the field

[Luttringer, Leo A., Jr.] The place of education in conservation, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(9), Dec. 1939, p. 10, 1 photo.

Review of the movement as presented at a conference of Conservation Education and Publicity Writers.

Education: Deeryard surveys

Welch, Charles, and A. G. Kettunen. Michigan's deer herd. A winter deeryard study for 4-H Club members, Michigan State College (East Lansing) Club Bul. 40, 30 pp., 25 figs., Oct. 1939.

The introduction by I. H. Bartlett refers to the original moderate number of deer, the advent of conditions favoring their increase, the overpopulation of winter yards, and the problems of management that confront the Department of Conservation. The body of the bulletin is a text for use in acquainting 4-H Club members with the factors responsible for the present status of Michigan's deer herd, with the characteristics of deer yards, their limiting factors, and the acreage relationship existing between the yards and the total deer range. Instructions are provided for mapping and reporting upon deer yards.

Education: Wildlife in vocational agricultural training

Whittle, C. A., H. B. Butner, and A. O. Duncan. A wild life program for Georgia farms, Georgia State Dept. of Education (Atlanta), 48 pp., illus., 1939.

Prepared for use in the instruction of students of vocational agriculture, this text discusses the place of wildlife on the farm, procuring wildlife for the farm, providing food and cover (called coverage), conserving wildlife, and trapping and skinning animals and handling furs, and gives brief accounts of the

more common vertebrates of the State. Bibliography of 14 titles.

Food Habits: Bears

Tench, C. V. Hunting down beef-eating bears, Forest and Outdoors (610 Canada Cement Bldg., Montreal, Canada), 35(11), Nov. 1939, pp. 331-332, 1 photo.

Heavy spring rains delaying the crop of wild berries, torrential streams preventing the animals from catching salmon, and reduction in the marmot population (also due to the storms) resulted in a shortage of food that apparently forced the bears to become stock-killers. Control became necessary and it was accomplished chiefly by government hunters with rifles. To the date of the article, more than 40 had been shot.

Food Habits: Chuckwalla

Shaw, Charles E. Food habits of the chuckwalla, Sauromalus obesus, Herpetologica (Walter L. Necker, 2001 N. Clark St., Chicago, Ill. 50 cents a copy), 1(6), 1939, p. 153.

Examination of 12 stomachs from San Diego County, California, revealed only vegetable food, scientific names of numerous items of which are given.

Food Habits: Crow

Kalmbach, E. R. The crow in its relation to agriculture, U. S. Dept. of Agriculture Farmers' Bul. 1102, 21 pp., 6 figs., 2 tables. Revised June 1939 (Jan. 1940) (Supt. of Documents, Washington, D. C. 5 cents a copy).

This well-known economic treatment of the crow, about half devoted to food habits and half to control measures, has been thoroughly revised. The changes relate especially to the author's studies of crows in relation to waterfowl on northern plains breeding grounds, the connection between the crow population of that region and the winter roosts in Oklahoma, and recently developed means of control. The general conclusion as to the economic status of the species remains the same as in the 1920 edition--the bird's tendencies for good or harm, from man's point of view, are about equal.

Food Habits: Deer, White-tailed

Lewis, M. G. Deer on refuge prefer peach twigs above other browse, Virginia Wildlife (Blacksburg, Va.), 5(3), Nov. 1939, p. 3.

Tabulation of number of shoots of 20 plants cropped on a tract near Salem, Va. Peach led with 118; black gum (103) and sour wood (49) were next.

Food Habits: Deer damage

McCain, Randall. Some effects of heavy deer concentrations in the Allegheny National Forest, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(10), Jan. 1940, pp. 10, 29, 1 fig., 1 table.

The deer population seems to have been increasing even recently as censuses showed acres per deer as 34 in 1935, 11 in 1936, 7 in 1937, and 8 in 1938. Fenced and unfenced plots in pine and spruce plantations revealed the damage being done by the deer. Pines outside the fence suffered 91% loss, those inside 11%; corresponding figures for spruce are: 36 and 20. Great difference in the condition of survivors also was apparent. The unfenced pine was browsed down to an average height of 4.6 inches, and the spruce 6.6; inside the fence these species averaged 24 and 20 inches, respectively. Suppressive effects upon native vegetation also were surveyed and are tabulated. Of comparable plots, a fenced one supported 303 plants of 9 species, while an unfenced one had only 140 plants of 7 kinds. Shrubs were more seriously injured than trees. In a third area a protected plot bore 1,788 stems, an unprotected one only 639.

Food Habits: Grouse, Ruffed

Kuhn, Tracy M. Fall foods of the ruffed grouse in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(10), Jan. 1940, pp. 4-5, 31, 1 fig., 5 tables.

Report on the contents of 330 crops. The average crop contained 5.2 different foods and had a volume of 8.3 cubic centimeters. The most important foods were cherry buds and twigs, sheep sorrel leaves, acorns, and aspen buds, with a combined volume of more than a third of the total food. Other items averaging from 4 to nearly 5 percent each were supplied by green brier, apple, foamflower, and grape. Animal food and that gleaned from crops were both negligible in quantity.

Food Habits: Gull, Herring

Mendall, Howard L. Food habits of the herring gull in relation to fresh-water game fishes in Maine, Wilson Bul. (Josselyn Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(4), Dec. 1939, pp. 223-226, 1 table.

Report on 50 stomach analyses that are tabulated. Author's summary: "From the results of this study, it does not seem that the presence of Herring Gulls at the inland lakes of Maine need cause any alarm to fishermen. Most of the fishes taken by gulls are either species that are very abundant or else those having comparatively little value; predations on the abundant species cannot be considered as detrimental to sport fishing. The favorite game fishes, trout and salmon, were found to constitute one of the smallest items in the gulls' diet. Herring Gulls are not as yet very plentiful at any locality within the interior of the State except at Moosehead Lake, and unless a large population of the inland birds occurs in the future, it would seem unwise to practice

any control. The taking of weak, dying, or dead fishes is probably of distinct benefit as a disease-control measure on behalf of the fish population. The general scavenger qualities of the gull are very commendable, especially in the summer resort areas. Fishermen and summer residents of Maine's lakes should not overlook the fact that, from the food-habits data at hand, the Herring Gull, in its present numbers, is an asset and not a liability."

Food Habits: Leucosticte

Mowbray, Vincent. Food and feeding habits of the Sierra Nevada rosy finch, Yosemite Nature Notes (Yosemite National Park, Calif.), 19(1), Jan. 1940, pp. 5-6.

Leucosticte tephrocotis dawsoni. "Flycatching", and feeding on flower heads of Hulsea algida, Hailardella scaposa, and Eriogonum lobbii, and upon the seeds of Arenaria nuttalli.

Food Habits: Lizards

Knowlton, George F. Lizard digestion studies, Herpetologica (Walter L. Necker, 2001 N. Clark St., Chicago, Ill. 50 cents a copy), 1(1), July 1936, pp. 9-10, 2 tables.

Laboratory studies of the rate of digestion of beet leafhoppers by Uta s. stansburiana and Sceloporus g. graciosus. Details of the experiments are presented in tables. Practically all leafhopper nymphs were digested by the lizards within 12 hours and 90 percent of the adults within 18 hours at temperatures of from 60° to 72° F.

Food Habits: Mink, raccoon

Hamilton, W. J., Jr. The summer food of minks and raccoons on the Montezuma Marsh, New York, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 80-84, 2 tables.

The environment is described and availability of foods indicated. Analyses of 300 scats of minks revealed muskrats, fishes, and aquatic beetles as the most important food items; results from 163 raccoon scats indicated preference for wild fruits, corn, and insects. All foods of both animals are tabulated and discussed.

Food Habits: Nutritive value, grains, etc.

Titus, Harry W. Practical feeding of poultry, Yearbook U. S. Dept. of Agriculture 1939 (Supt. of Documents, Washington, D. C. $1.50 a copy), pp. 819-843, 3 pls., 9 tables.

Cited here principally on account of the results of analyses of feedstuffs it presents, some of which relate to grains, seeds, etc., in which wildlife managers are interested. Examples are: feterita, kafir, milo, proso,

shallu, and sunflower seeds. The composition of numerous grains and greens, and of feeds of animal origin is tabulated, as are also their principal mineral and vitamin constituents.

Food Habits: Ochotona

Butts, Edward. The labors of a cony, Yosemite Nature Notes (Yosemite National Park, Calif.), 19(1), Jan. 1940, pp. 3-4, 1 fig.

Description of feeding habits and analysis of a hay pile; contents: 62 willow tips, 31 Phacelia flower heads, 16 pieces of Carex, 1 stem of Lupinus longipes, and 2 plants of Queen Anne's lace.

Food Habits: Pheasant, Ring-necked

Fried, Louis A. The food habits of the ring-necked pheasant in Minnesota, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 37-56, 1 graph, 4 tables.

Author's abstract: "The crop and gizzard contents of 659 Minnesota pheasants collected in every month of the year were analyzed. Cultivated grains formed 81.3% of the total annual food. Corn was the most important single item in the pheasant's diet, 49.5% of all the foods eaten. Other important grains were oats, barley, and wheat. The damage that pheasants are claimed to do to growing corn is greatly exaggerated. The annual weed crop is very little affected by pheasants even though they consume large quantities of weed seeds. Seeds of the foxtails (Setaria viridis and Setaria glauca) and common ragweed (Ambrosia artemisiaefolia) are the most important foods obtained from weeds. Wolfberry (Symphoricarpos occidentalis) was the largest of the fruit items. Grasshoppers and crickets made up nearly 75% of the total volume of animal food. Grasshoppers were consumed in the largest amounts in April and July when in the egg and nymphal stages, respectively.

Food Habits: Rodents, Desert

Monson, Gale, and Mayne Kessler. Life history notes on the banner-tailed kangaroo rat, Merriam's kangaroo rat, and the white-throated wood rat in Arizona and New Mexico, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 37-43, 2 tables.

Authors' abstract: "Seventy dens of the banner-tailed kangaroo rat (Dipodomys spectabilis), 74 of the Merriam's kangaroo rat (Dipodomys merriami), and 82 of the white-throated wood rat (Neotoma albigula), were excavated in southeastern Arizona and southwestern New Mexico in an effort to obtain life history information, particularly on food habits. Data thus collected indicated that these rodents subsist largely on the seeds and other parts of annual grasses, forbs, and desert shrubs. They are, therefore, not especially harmful to the perennial grasses regarded as the most valuable constituents of grazing. Although knowledge of the relationships of these rodents to range forage still

leaves much to be investigated, plans for controlling them should be carefully considered before being adopted."

Food Habits: Utilization of timber tree products

Van Dersal, William R. Some important timber trees and wildlife, Soil Conservation (Supt. of Documents, Washington, D. C. 10 cents a copy), 5(5), Nov. 1939, pp. 103-107, 4 photos.

From an economic as well as a biologic point of view, wildlife is an asset to the forest which in turn provides it with a home. "There is no operation that is silviculturally sound which cannot influence wildlife to advantage if properly used." Forest values whether for timber production, wildlife, or soil and water conservation, fluctuate as one and the total worth of a forest depends on the maximum expression of its several values. This paper is devoted especially to portraying the values of timber trees to wildlife, which it does in a series of sketches giving general characteristics, number of species, and range of the trees, and their utilization by wildlife. The groups treated are the pines, Douglas fir, oaks, hemlocks, red gum, maples, redwood, cypress and spruce, tuliptree and tupelo, chestnut and beech, and ash, basswood, sycamore, and locust.

Forest Service: Annual Report 1938-39

Silcox, F. A. Report of the Chief of the Forest Service 1939, 48 pp. (Supt. of Documents, Washington, D. C. 10 cents a copy).

Wildlife is mentioned in an account of CCC work (both restoration and control activities), and in a special section (pp. 43-44) in which the numbers of big game and fur animals on the National Forests are summarized, and policies as to wildlife management are defined.

Life Histories: Beaver

Bradt, G. W. Breeding habits of beaver, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(4), Nov. 1939, pp. 486-489, 1 graph.

Notes on copulation, gestation period (about 4 months), weight at birth (about 1 pound), and growth rate in captivity for a year. Bibliography of 6 titles.

Life Histories: Bighorn

Davis, William B., and Walter P. Taylor. The bighorn sheep of Texas, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(4), Nov. 1939, pp. 440-455, 3 figs., 1 table.

The habitat of the animals, entirely west of the Pecos River, is described, and the population of 15 groups of mountains discussed. Life history details are treated as territorial preference, daily activities, beds, feces, movements, young, water requirements, and food. Propagation in captivity is

deemed feasible. Reasons for the small population are discussed; competition of livestock is apparently foremost, but there may be some unrecognized factor even more important. The number of bighorns in the region has never been large in the past and perhaps never will be great enough in the future to warrant an open season. Bibliography of 9 titles.

Life Histories: Crow

Imler, Ralph H., and Frank B. McMurry. Sex ratio and weights of crows wintering in Oklahoma, Wilson Bul. (Josselyn Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(4), Dec. 1939, p. 344.

Of 1,000 birds picked up where a crow roost had been bombed, 526 were males, and 474 females; the average weights of those groups were 1.05 and 0.93 pounds, respectively.

Life Histories: Deer, White-tailed

Ruff, Frederick J. The white-tailed deer on the Pisgah National Game Preserve, North Carolina, U. S. Forest Service, Southern Region (Glenn Bldg., Atlanta, Ga.), 249 pp., 1 map, 7 figs., 37 tables, mimeographed, Nov. 1939. [Apparently a de luxe edition exists as spaces are left for 27 photographic illustrations of which a list and legends are given.]

Report of results of a detailed 6-year study that condenses a great deal of information on the characteristics, habits, and life history of the Pisgah deer. The food requirements are thoroughly considered, palatability ratings of available foods presented, and the carrying capacity of the range, and effects of deer use on vegetation discussed. There is a section also on diseases, parasites, and natural enemies. Conclusions and recommendations form a final chapter and an appendix contains tabulations of stomach contents, relative growth of plants under protection and under deer use, percentage of use of important plants, occurrence of internal parasites, use of salt, and composition of the major types and subtypes of vegetation on the Forest. Bibliography of 14 titles. A noteworthy compendium, the value of which will be the more appreciated with use.

Life Histories: Duck, Black

Kutz, Harry Leon. The diving ability of the black duck, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 19-20.

Author's abstract: "Baiting with cracked corn in known depths marked with buoys revealed that black ducks (Anas rubripes) were able to dive and get grain in ten feet of water."

Life Histories: Flamingo

McCann, Charles. The flamingo (Phoenicopterus ruber antiquorum Temm.), Journ. Bombay Nat. Hist. Soc. (6 Apollo St., Bombay, India. 10 rupees a copy), 41(1), Aug. 1939, pp. 12-38, 7 pls.

A co-subspecies with P. r. ruber of the Americas; in connection with presenting notes on his own observations in Cutch, India, the author summarizes accounts by others, particularly those of Abel Chapman in Spain and Frank M. Chapman in the Bahamas. Distribution, and breeding grounds and breeding seasons are treated as well as nesting sites, nests, eggs, young, plumage, molt, structure of the beak and tongue, habits, food, relation of food to coloration, and migrations. Bibliography of 23 titles.

Life Histories: Foxes

Anon. The fox in New Hampshire, New Hampshire Fish and Game Dept. (Concord) Tech. Circular 1, 9 pp., 1 graph, tables, mimeographed, n. d.

Estimate of the fox population and of poultry losses due to foxes; number of animals taken annually 1928-35, and their fur value; seasons on foxes in New England and Middle Atlantic States; proportion of sportsmen hunting foxes; notes on food of red and gray foxes, compiled from a variety of sources, including 6 analyses of stomachs from New Hampshire.

Life Histories: Golden-eyes

Munro, J. A. Studies of waterfowl in British Columbia, Barrow's golden-eye, American golden-eye, Trans. Royal Canadian Inst. (198 College St., Toronto, Canada), 22(2), No. 48, pp. 259-318, Pls. 2-6, 4 figs., tables.

Distribution, life history, and economic status in British Columbia of the birds mentioned. The accounts include descriptions (accompanied by illustrations) of these in most respects closely similar species, and full statements of distribution, seasonal movements, courtship, nesting, and food habits. The Barrow's golden-eye, though the rarer form, has headquarters in British Columbia and is treated in most detail. For this species, sections are added on behavior of yearlings, general observations on females and young, and especially on population studies. The food of the two species is about the same under similar conditions of time and place. "While on fresh water both x x x feed upon salmon eggs, insect larvae, and occasionally small fish. In salt waters they eat crustaceans and mollusks, and, for a short time, herring ova." The author believes that predation by these birds does not cause an appreciable drain on salmon eggs. Control is scarcely needed and is inadvisable because it might seriously reduce the population of the comparatively local Barrow's golden-eye.

Life Histories: Man-o'-war bird

Murphy, Robert Cushman. Man-o'-war, Natural History (American Museum of Natural History, New York, N. Y. 50 cents a copy), 44(3), Oct. 1939, pp. 133-143, 2 graphs, 16 photos.

Popular account of habits, distribution, plumage patterns, and relationships; authoritative, thoroughly and attractively illustrated.

Life Histories: Muskrat

Errington, Paul L. Observations on young muskrats in Iowa, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(4), Nov. 1939, pp. 465-478, 3 figs.

Author's summary: "During 5 years (1934 to 1938) of field work on Ondatra zibethica zibethica in Iowa, about 1900 small-sized young and nearly 800 larger individuals were handled. The data--especially those resulting from the tagging of 588 young--portray much of the life history, growth, and development of this animal for the first 8 months after birth. Numbers of very young animals in 158 evidently complete litters average 6.5; the members of 7 of these litters were kept by their mothers in different nests or in different marsh habitations. The sex ratio of 878 young in 162 litters less than 2 weeks old was 54.4 percent males, compared with the late fall and early winter ratio of 54.9 percent for 584 young of the year. At birth blind, and almost helpless, weighing about 21 grams and measuring 100 mm. in total length, the young commonly opened their eyes between the fourteenth and sixteenth days. They were then capable of considerable activity, weighed about 80 grams and measured about 200 mm. Weaning took place mostly in the fourth week, and the young (about 180 grams and 285 mm.) were living independently by the end of their first month. By this time their mothers, if pregnant, were generally ready to give birth to subsequent litters. The young reached the 'kit' stage (about 500 to 650 grams and 400 to 480 mm.) at between 70 and 90 days; at 3-1/2 months many were similar in size and appearance to small and medium-sized adults. The majority of the young of the year taken by trappers in November and December were from 5 to 8 months old and very adult-like except for their imperfect sexual development. Limited data indicate that, by the end of the first year, muskrats reach average weights close to 1100 grams, and lengths close to 550 mm. The larger young males showed signs of approaching sexual maturity by mid-winter, or at 8 to 9 months."

Bibliography of 11 titles.

Life Histories: Muskrat

Hamerstrom, F. N., Jr., and James Blake. Central Wisconsin muskrat study, American Midland Naturalist (Notre Dame, Indiana), 21(2), March 1939, pp. 514-520, 1 table.

Muskrat study in a drainage ditch environment; the results probably applicable to many drained areas in the upper Mississippi Valley. Constantly varying water levels were reflected all the time by shifting populations. Food habits are discussed and the food plants tabulated so as to show parts used and season and degree of utilization. Carex, Glyceria, Lycopus, Sparganium, and Typha are of most importance. Winter decrease in population is attributed to unbalance between food and water supplies; water conservation apparently is the best corrective. A few unsolved problems also are discussed. Bibliography of 8 titles.

Life Histories: Partridge, Chukar

Aron. The chukar partridge (Alectoris graeca chukar), New Hampshire Fish and Game Dept. (Concord) [4 pp.], mimeographed, n. d.

Popular account of the bird, its habits, natural range, introduction, food, breeding, and sporting value.

Life Histories: Pheasant, Ring-necked

Randall, Pierce E. Nesting habits and causes of nest mortality of the ringneck pheasant, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, Pa. 10 cents a copy), 10(9), Dec. 1939, pp. 6-7, 30, 5 photos, 4 tables.

Observations on 310 nests in a first-class farming district. Clutch sizes: 4 to 20, average 10.9; earlier ones larger. Fertility 94, hatch 90, percent; sex ratio of adult birds 1:6. Location of nests as to types of cover is described and tabulated. The percentage of success was greatest (50) in pastures and potato field and lowest (0) in orchards, brush, woods, and grain stubble. Despite high losses, production was greatest in hayfields. The cocks showed territorial instincts but hens apparently did not; in a number of instances two occupied nests were observed only a foot or even less apart. Net nesting success was only 20.3, and in the best environments was less than 30, percent. In hayfields, late nests had a much higher degree of success than did early ones. Man's activities destroyed more nests (56.6 percent) than all other agencies combined; mowing alone was responsible for 39.7 percent of the losses. Predators caused 30.6 percent of the failures, skunks and crows outranking others. All nest losses are tabulated according to cause. Due to renestings, from 50-60 percent of the hen pheasants eventually succeeded in bringing off broods. A few improvements in management are suggested.

Life Histories: Phoebe

Stoner, Dayton. Temperature, growth, and other studies on the eastern phoebe, New York State Museum (Albany), Circ. 22, 42 pp., 27 figs., 5 tables, Nov. 1939.

Notes on habits of the phoebe and especially on its nests and nesting, including number, color, shape, size, and weight of eggs, and length of incubation period. From daily observations and measurements, temperature and growth records were made; they are discussed, tabulated, and illustrated. Seventeen different measurements were made to reveal growth changes in bones and feathers. The findings are summarized in 17 paragraphs and there is a bibliography of 42 titles.

Life Histories: Plover, Upland

Buss, Irven O., and Arthur S. Hawkins. The upland plover at Faville Grove, Wisconsin, Wilson Bul. (Josselyn Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(4), Dec. 1939, pp. 202-220, Pls. 7-8, 4 figs., tables.

This bird, once greatly reduced in numbers, has increased at Faville Grove in recent years and is reported as having become more common also in Minnesota and Pennsylvania. The authors have made an interesting life history study of this highly eligible species for which they discuss the pre-nesting period, courtship, nesting, re-nesting, incubation period, nests and eggs, choice of nesting site, success of nests, territory, post-nesting period, food habits, and management. General protection is essential and nests may be defended by fencing as the birds will not desert. Bibliography of 15 titles.

Life Histories: Quail, California

Erlen, J. T., Jr. Sex and age ratios in survival of the California quail, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 92-99, 3 figs., 3 tables.

Author's abstract: "Data from museums, banders' reports, hunters' bags and field observations provided 17,652 records for the California quail (Lophortyx californica). The sex ratio was 113.2♂:100♀, the age ratio (summer records excluded), 146 immature:100 adult. Both ratios varied accordi to locality, season, and year. Average survival calculated on the basis of ag ratio is 8.5% from egg to one year, 51% from 6 to 18 months, and 50% per year after 12 months. The relations of population level (P), replacement (R), and survival (S) are considered for four localities; S=P (100-R). Age ratio data make it possible to determine local critical seasons for quail; a high proportion of immature birds apparently results from inimical winters, a low proportion from critical summers. Utilization of such information is suggested in planning quail management programs and in analyzing waterfowl and cyclical gam losses."

Life Histories: Road-runner

Dobie, J. Frank. The roadrunner in fact and folk-lore, 31 pp., 1939 Texas Game, Fish, and Oyster Commission (Austin). Reprinted from In The Shadow of History 1939 (Texas Folk-Lore Society, Austin) and in part from Natural History Magazine (American Museum of Natural History, New York, N. Y.), Sept. 1939.

Factual sections review the food, nesting, and general habits; role of the bird as a killer of rattlesnakes is discussed. Folklore is retold and fol names of the species catalogued. Conservation of the road-runner is urged.

Life Histories: Sparrow, Field

Walkinshaw, Lawrence H. Nesting of the field sparrow and survival of the young, Bird-Banding (Charles E. Floyd, 210 South St., Boston, Mass. 75 cents a copy), 10(3), July 1939, pp. 107-114, 1 map, tables; 10(4), Oct. 1939, pp. 149-157, 1 photo, tables.

Observations near Battle Creek, Michigan, on some 130 nests are reported upon as to general nesting habits of the species, eggs, incubation, and the young, their survival, and weights. Average number of eggs 3.39; sets were smaller in late than in early nests; incubation period, 11 days; that of fledging, 13-14 days; young were produced in 49 out of 97 nests to the number of 145 from 165 hatched eggs, a percentage of 57.5. Banding experience is described. Bibliography of 10 titles.

Life Histories: Squirrel, Fox, dens

Baumgartner, Luther L. Fox squirrel dens, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(4), Nov. 1939, pp. 456-465, 2 pls., 1 fig., 1 table.

Characteristics of dens and den trees; process of den formation (includes excavation of partly decayed wood, and constant trimming of entrances to size, which averages 2.9"x3.7"); factors involved in den formation; management suggestions. Tabulation of 169 dens as to species of tree in which located; white oak, elm, and beech comprised 53 percent of the total in Ohio. Squirrel conservation demands preservation of den trees.

Management: Attracting birds

McKenny, Margaret. Birds in the garden and how to attract them, xviii+349 pp., numerous plates, 1939. (Reynal and Hitchcock, 386 Fourth Ave., New York, N. Y. $5.00 a copy).

An attractive well-illustrated and easily legible book, the contents of which are in harmony with its impressive appearance. The author deals with a subject in which she has long been interested and she has put forth considerable effort to make the book factually satisfactory. The publishers have collaborated by including 120 pages of reference material giving details of real value to earnest users of the work. The text is organized in 18 chapters that treat of the value and habits of birds, planting in gardens, feeding devices, bird homes, water supply, and protection. Reference sections relate to plants useful to attract birds in various sections of the country and the birds attracted by them, to planting to attract waterfowl, planting city gardens, and to pertinent publications.

Management: Bob-white

Komarek, Roy. How Florida can protect its bob white quail, North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh), 4(1), Jan. 1940, pp. 6-11, 2 photos.

Environmental deficiencies may affect quail as seriously as overshooting. Favorable and unfavorable characteristics of environment and means of controlling cover and food production are discussed. Maintenance of year-round food supply and policy as to quail enemies also receive attention. Improvement of environment is preferable to artificial propagation; kill should be limited to 25 percent of the population. Popular misconceptions (rearing of second broods,

perils of inbreeding) are discounted. Reprinted from the Florida Magazine (not available here).

Management: Burning

Watson, Leroy, Jr. Controlled burning and the management of longleaf pine, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 38(1), Jan. 1940, pp. 44-47.

"Although the advantages of controlled burning in x x x management of longleaf pine have been presented, the attitude of foresters remains in general one of opposition." The evidence is reviewed and the conclusion reached that "foresters in the long-leaf pine belt should act on the basis of available fact which show the advantages of properly controlled fires at intervals of several years." Wildlife is mentioned in connection with seed consumption (its role is not seriously detrimental to longleaf pine reproduction); and with cover control in game management. Bibliography of 27 titles.

Management: Cottontail

Hickie, Paul. Helping the cottontail, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(3), Dec. 1939, pp. 3, 11, 12, 3 figs.

Kills in 1937 and 1938 were about 2,300,000 and 2,500,000, respectively. About 10 acres of land on the average are required to produce one rabbit for the hunter. One-fifth of the gunners get half of the cottontails bagged. The average take is 7-8 rabbits per year, the least successful hunters barely averaging one bunny each. The limit must be determined by the harvestable surplus the land will produce, not by what anyone thinks is "enough." Apparently nothing can put as many rabbits in coverts as the hunters desire, but they must learn to be content with what is feasible. Providing artificial cover is very helpful to the cottontail population and is something sportsmen can do to help themselves. Costly management measures will not ordinarily be adopted by farmers but the way is open for sportsmen to cooperate. The harvest should be in proportion to the crop.

Management: Environmental improvement

Dambach, Charles A., and E. E. Good. The effect of certain land use practices on populations of breeding birds in southwestern Ohio, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 63-76, 1 pl., 2 figs., 6 tables.

Authors' abstract: "Counts of breeding bird populations incident to different land use practices were made on the Soil Conservation Service project area at Hamilton, Ohio during 1937, '38, and '39. Data were obtained by recording singing male territories and observing nesting activities of either sex. Cropland populations were greatest in meadows (47.90 pairs per 100 acres) followed in order by small grain (10.26) and corn (5.23). Populations for the

same crops when in strips varying from 98 to 130 feet wide were materially greater, averaging 92.73 pairs per 100 acres in meadow; 27.35 in small grain, and 3.82 in corn. The strips decreasing the size of acceptable territories is believed to be the most important factor contributing to this difference. Populations in protected woods were 225.35 pairs per 100 acres compared to only 111.11 in grazed woods. The total effect of soil conservation planning on breeding bird populations on farms actually replanned was to increase them 38.16 per cent. This estimate does not include increases resulting from miscellaneous beneficial practices but only those that affected a considerable proportion of the farm area."

Management: Farmer-sportsman relationship

Brown, C. B. The land user and the hunter, Arizona Wildlife and Sportsman (125 North Second Ave., Phoenix, Ariz. 15 cents a copy), 1(10), Oct. 1939, pp. 4-5.

Tabulation of land ownership in Arizona; only 24.6 percent is privately owned and only 1 percent cultivated. Nevertheless the policy of land users has benefitted wildlife. Sportsmen should recognize that fact, should keep clearly in mind where public use ends, and should maintain an attitude of friendly cooperation. A behavior code is given.

Management: Food patches

Anon. Wildlife food strip planting, Rhode Island Agr. Expt. Sta. (Kingston) Misc. Publ. 2, 3 pp. (mimeographed), Feb. 1939.

Locating, liming, fertilizing, and planting food patches; a seed mixture is recommended; estimated cost per acre, not including labor, $36.

Management: Feeding

Anon. Needs of wildlife in winter, Outdoor Iowa (Iowa Conservation Commission, Des Moines), 1(12), Dec. 1939, pp. 12-1.

Usefulness of winter feeding urged. The U. S. Soil Conserv[illegible]e has established 950 and the State Conservation Commission 415 emerg. stations. Suggestions as to supplies of food and grit and as to mana stations. Nearly 1,300 pounds of hegari seed was distributed to farm in making food patches.

Management: Forest management in relation to wildlife management

Moore, E. B. Forest management in New Jersey, New Jersey Dept. of Conservation and Development (Trenton), 55 pp., 29 figs., 16 tables, 1939.

Three brief sections (pp. 21, 29, 46) of this booklet are devoted to wildlife. They refer to the effect of forest cuttings and plantings, the value of edge, the desirability of interspersion of wood, brush, marsh, and cultivated lands, the critical importance of winter food and cover, and to the value

in both forest and wildlife management of cleared fire lanes and food strips.

Management: Forest management in relation to wildlife management

Moore, E. B. Forest and wildlife management in the South Jersey pine barrens, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 38(1), Jan. 1940, pp. 27-30, 1 fig.

Wildlife as the basis of recreation deserves consideration in connection with forest management. This calls for coordination of overlapping and sometimes conflicting objectives. Lack of fertility has resulted in the pine barrens being preserved practically as a wilderness. Fires are frequent. Recent forest practice has been directed toward increasing the proportion of pines among the preponderant oaks. As to wildlife, deer too plentiful for the interests of cranberry and blueberry growers; other game populations are sparse. Food is the limiting factor and management for increase should be directed toward thinning and opening the existing uniform cover so that more food will be produced. The work being done starts at known centers of quail and rabbit populations, radiating from which strips connecting clearings are cut, planted and improved as to cover. Only native species (listed) are used for planting. From 12 to 15 percent of the total area is in strips and clearings including fire-breaks. A third of the total cost is considered properly chargeable to fire control. Bibliography of 7 titles.

Management: Forest wildlife

Mattoon, M. A. The third responsibility, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(9), Dec. 1939, pp. 14, 32, 1 photo.

After protection and maintenance of forests comes resource management which should be for multiple use. The wildlife-forest relationship should be kept in reasonable balance under technical guidance. Environment can be improved by relatively simple measures, some of which are mentioned. Management of wildlife calls particularly for adjustment of numbers to carrying capacity. The forester should cooperate fully with other authorities responsible for the welfare of wildlife. Education is necessary to public acceptance of wildlife management.

Management: General

Anon. Game management, Wisconsin Agr. Expt. Sta. (University of Wisconsin, Madison), Ann. Rep. 1938-39, Pt. 1 (Bul. 446), Nov. 1939, pp. 21-23, 1 map.

Map showing gradual spread of Hungarian partridges in southeastern Wisconsin from plantings made as early as 1908. Experiments with prairie chickens indicate that buds are not a subsistence ration for these birds. Farmers who wish to encourage them should leave a few corn shocks or a buckwheat stack in an open field for their use. The yield of certain wild food crops calculated from samples was seeds of: yellow and green foxtail grasses,

50-450 lbs. per acre; barnyard grass up to 300 lbs.; and lesser ragweed 80-130 lbs. Waste soybeans threshed out 150 pounds to the acre. Trapping studies revealed carrying capacity of a certain tract as 2 cottontails per acre and movements of the animals during the breeding season as far as a mile.

Management: General, Iowa

Scott, Thomas G., and George O. Hendrickson. Iowa's wildlife is increasing, Outdoor Iowa (Iowa State Conservation Commission, Des Moines), 1(12), Dec. 1939, supplement, 4 pp. unnumbered. Reprint from Farm Science Reporter, Jan. 1940.

Popular article referring to early abundance of wildlife and its depletion as the human population increased, to conservation efforts of the State Conservation Commission, and to cooperative programs of research as a basis for sound management. Illustrative experiences with the ring-necked pheasant and the bob-white. The farmer's role in conservation and farmer-sportsman relationships.

Management: Herd regulation

Edwards, Oliver T. 1939 Winter deer range survey report, Malheur National Forest, Oregon (John Day, Oreg.), 21 pp., 3 tables, mimeographed, 1 map (lithoprint), Aug. 1939.

Management problems have arisen due to too much protection and not enough utilization of big game. Overpopulation of mule deer on the Malheur Forest, evident as early as 1933, grew worse because existing laws and sentiment hindered herd regulation. A range survey in 1938 led to some remedial measures. In the 1939 report, estimates (based on sample counts) of the number of deer and of the carrying capacity indicate that the better ranges still have twice as many animals as they should have. Although the winter was favorable, some of the most important browse plants as bitterbrush and mountain mahogany suffered considerable damage. Remarks on populations and food utilization are given for 15 areas. Competition with elk is not yet very serious but the elk herd should be favored on only a limited portion of the Forest; all other areas should be managed primarily for mule deer. Competition with cattle is thoroughly discussed; the range has been overstocked with both cattle and deer; in properly regulated numbers they would not seriously compete. Winter losses were chiefly among yearling deer. The increase from breeding in 1938 was from 20 to 25 percent; for 1939 it is estimated at about 10 percent. Weights and antler measurements are given for many bucks, and weights for 91 does and 19 fawns. They indicate decline due to malnutrition. Management problems are discussed in the light of local economics and suggestions given additional to those in the 1938 report. The fifty percent reduction in deer numbers required is difficult to achieve by hunting, especially if public sentiment is in any degree adverse. An educational campaign is needed.

Management: Inventory, black brant

Moffitt, James. Ninth annual black brant census in California, California Fish and Game (Terminal Island, Calif.), 25(4), Oct. 1939, pp. 336-342, 1 table.

The tabulation shows the results for 7 localities in 9 years; the 1939 figure is a little larger than the average for the previous seven years but slightly less than that for 1938.

Management: Inventory, game on national forests

Shantz, H. L. America's wildlife, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(9), Dec. 1939, pp. 11, 27, 1 photo.

Review of Forest Service big game estimates for 1939; the total number of big game animals on national forests was estimated at 1,842,000, an increas of 6 percent over the figure for last year and of 300 percent over that for th first attempt in 1921. There is an average of more than 5 head of big game or every square mile within the national forest boundaries. It is calculated tha 32 percent of all the big game in the United States is found on national forests; 62 percent on State and private lands; 4 percent on grazing districts and the remaining 2 percent on National Park Service, Biological Survey, and Indian Service lands. Distribution by groups is summarized, deer being by far the most numerous class. Wildlife policies of the Forest Service are outlined

Management: Inventory, pheasants, etc., Ohio

Hicks, Lawrence E. Status of Ohio game birds, 1938, Ohio Wildlife Research Station (Columbus), Release No. 122, 23 pp., 18 figs., 7 tables, Nov. 1939.

Trends in game bird populations in the major pheasant belt of 15 counties for the year are compared to those of previous years. There is a summary containing 24 paragraphs that give among other averages those for: pheasant nesting frequency (7 per square mile); nests per 100 acres in forage crops (12.5); number of pheasants per square mile (75 in 1938, 89 in 1939; different figures on pp. 1 and 2); bob-whites 1938, 57.3, and Hungarian partridges 1938, 7.2 per square mile; proportion of farm operators that hunt (about 2/3), their annual bag of all kinds of game (64 head); and pheasant highway mortality (7.7 birds per 1,000 miles). These and other matters are treated in detail in text, graphs, and tables. The numbers of crows and hawks seen by the field observers (17.7 and 0.80 per man day) were larger in counti having the most pheasants. The paper closes with a bibliography of 24 titles of related reports by Hicks and Leedy.

Management: Land planning for wildlife

Gabrielson, Ira N. Land use considers wildlife, U.S. Dept. of Agriculture, Extension Service Review (Supt. of Documents, Washington, D. C. 10 cents a copy), 10(11), Nov. 1939, p. 163.

Summary of refuge acquisition and development (254 areas, 13-1/2 million acres, 21 million dollars since 1934). The conservation of wildlife has a definite place in any program of land use, and is being considered by land planning agencies. The Biological Survey will be represented on State committees. Federal organizations involved are all interested in wildlife conservation and their combined efforts will be of much practical importance.

Management: Muskrat

Lay, Dan W. Survey indicates muskrat crop can be increased, Monthly Bulletin Texas Game, Fish, and Oyster Commission (Austin), 3(1), Dec. 1939, pp. 4-5, 1 photo.

Yields, not uncommonly 10 pelts to the acre, and prices 70-80 cents per skin, have interested Texas coastal farmers in muskrats. "Unwise trapping, grazing, turning, or other disturbances have serious effects on the muskrats." Good management pays, net returns often being $3. per acre. Muskrat lodges vary in average number from 0.11 to 11.9 in 5 different grades of environment, the characteristic plants of which are listed. Six management recommendations, cheap because mostly negative in character, are made, and in addition 5 others that require substantial expenditures. Marsh management could quadruple the muskrat harvest estimated for 3 counties in 1938 at 375,000 pelts valued at close to a quarter of a million dollars.

Management: Planting for wildlife, Connecticut

Cronie, G. A., and Raymond Kienholz. Survival and growth of exotic game-food shrubs, Connecticut Agr. Expt. Sta. cooperating with the Connecticut Forestry Dept. (Hartford), Rep. of Progress Circ. 6, 2 pp., mimeographed, Nov. 1939.

From observations made of plantings on State forests, the authors conclude: "(1) That the planting of exotic shrubs is unprofitable and useless unless a tremendous amount of weeding is done to protect them from the encroachment of native root-established and more vigorous species and specimens; (2) that almost everywhere along fence rows, in abandoned fields, pastures and in moist or rocky hillside woodland areas there are native food-bearing shrubs, trees and vines which will flower and fruit more abundantly if released from overtopping trees by a small amount of weeding--perhaps repeated at intervals of a few years; (3) where areas exist that have no or few native berry bearing plants, planting may be resorted to, but preference should be given to larger sized specimens of native species which can maintain themselves with a minimum of attention."

Management: Planting for wildlife, Lespedeza sericea

Pieters, A. J. Lespedeza sericea and other perennial lespedezas for forage and soil conservation, U. S. Dept. of Agriculture Circular 534 (Supt. of Documents, Washington, D. C. 10 cents a copy), 43 pp., 27 figs., 7 tables, Nov. 1939 (Jan. 1940).

Discussion of adaptations, culture, and uses of Lespedeza sericea, with supplementary notes on other species and bibliography of 22 titles. A section (pp. 31-32) on "Sericea for wildlife" calls attention to the value of the plant in providing food and cover and makes suggestions as to its planting.

Management: Planting for wildlife, Mississippi

Batson, F. S. Common native shrubs of Mississippi for landscape plantings, Mississippi Agr. Expt. Sta. (State College, Miss.), Mimeographed Circ. 100, March 1939, 13 pp., 1 table.

Although this publication does not mention wildlife, it will be of valu to anyone undertaking a planting program in Mississippi or nearby. Directions for planting are included as well as descriptions of 34 species of shrubs, and a tabulation giving scientific and vernacular names of the plants, their types as to evergreen or deciduous, their heights in feet, light preferences, seasons of bloom, etc.

Management: Planting for wildlife and erosion control

Anon. Key to site adaptations of woody plants recommended for plantations, together with supplementary information, Soil Conservation Service Region One (Upper Darby, Pa.), 21 pp., mimeographed, 1939.

Plants are listed by scientific names according to their light tolerances and under each division, in conformity with their adaptations as to soil moisture and alkalinity. The table of supplementary information gives both scientific and vernacular names, states growth habit, type of planting to which adapted, wildlife food value, persistence of fruit, and planting range, and contains also remarks on resistance to browsing, cover value, etc.

Management: Planting for wildlife and erosion control

Franklin, Sydney. Mulching to establish vegetation on eroded areas of the Southeast, U. S. Dept. of Agriculture Leaflet 190 (Supt. of Documents, Washington, D. C. 5 cents a copy), 8 pp., 6 figs., 1939 (Jan. 1940)

Wildlife is barely mentioned in this publication but wildlife managers will be glad to have available its practical instructions in the use of mulch and nurse crops in establishing growths of ground cover, especially lespedezas

Management: Ponds

Davis, William G. Wildlife will come where it is invited, Missouri Wildlife (208 Westport Rd., Kansas City, Mo.), 2(5), Dec. 1939, pp. 7, 11, 2 photos.

Development of ponds for erosion control improves conditions for wildlife and is of both esthetic and economic benefit. Suggestions are given as to planting to hold banks, to provide cover and windbreaks, and to reduce wave action. Protection from burrowing animals and from livestock may be necessary

Management: Refuges, Federal program

Gabrielson, Ira N. The refuge program of the Biological Survey, Bird-Lore (1006 Fifth Ave., New York, N. Y. 30 cents a copy), 41(6), Nov.-Dec. 1939, pp. 325-332, 4 pls.

The concentration of the waterfowl population in comparatively restricted wintering areas makes it imperative that marshes in those regions be preserved or restored. Favorable wintering grounds in addition to suitable breeding tracts and migration-path refuges have been acquired by the Biological Survey through the years so that now there are about 15,500,000 acres in the Federal refuge system. Special objectives of some of both waterfowl and big game reservations are mentioned. Plans call for the addition of about 8,000,000 acres of refuge lands within the United States. The use of areas for conservation purposes obtained by easements is proving a useful supplement to the acquisition program, and now involves some 80 projects totalling about 133,000 acres. These and other refuge areas contribute also to water conservation, flood control, and recreational facilities. Further they are of benefit to many forms of wildlife besides those for which they have primarily been set aside.

Management: Refuges, Hart Mountain

Jewett, Stanley G. Hart Mountain Antelope Refuge, U. S. Dept. of Agriculture Misc. Publ. 355 (Supt. of Documents, Washington, D. C. 10 cents a copy), 26 pp., 23 figs., June 1939 (Jan. 1940).

History of the area, development of the refuge since its establishment in 1936, description as to topography and life zones and their characteristic plants and animals. Mammals and birds known from the area are listed, and information for tourists and a list of other big game refuges given.

Management: Refuges, Mississippi

Anon. Game refuges in State comprise over 240,000 acres, Mississippi Game and Fish (Mississippi Game and Fish Commission, Jackson), 3(11), Nov. 1939, p. 1, 2.

List of 40 refuges and their acreages.

Management: Songbird

McAtee, W. L. A venture in songbird management, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 85-89, 6 tables.

Near Glenn Dale, Md., installation of bird houses attracted birds so that in some seasons the normal population of the area was quadrupled. Brood production in typical years varied from 18.3 to 26.6 per acre. On the average, about half of the nest boxes were occupied. Diameter of entrance was probably the most important factor influencing birds in their choice of homes. The

sizes ordinarily recommended for various birds were found satisfactory except in the case of the house wren which preferred an entrance an inch or larger in diameter. Boxes placed at moderate heights (5-7 feet) were well utilized and were most convenient for inspecting and cleaning. Apparently from 80-90 percent insolation was most favorable for brood production. Intruders were best dealt with by simple removal.

Management: Stocking, caribou

Cox, William T. Woodland caribou in Minnesota, Soil Conservation (Supt. of Documents, Washington, D. C. 10 cents a copy), 5(6), Dec. 1939, pp. 138-143, 156, 2 figs.

The woodland caribou has been extirpated from a great deal of the southern part of its range even in Canada and is far on the road to extinction. The Minnesota herd, reduced to 33 in 1913 and to a much lower number later, is to be recruited by animals transplanted from Saskatchewan. The bulk of this article is made up of Jack Manweiler's accounts of surveys of the Beltrami Island reservation where the animals were placed and of the capture of a number of caribous and bringing 7 calves to the project area.

Management: Stocking, pheasant

Gould, Ernest W. A study of the pheasant in New Hampshire during the spring and early summer, New Hampshire Fish and Game Dept. (Concord), 10 pp., 1 fig., 2 tables, mimeographed, n. d.

The history of 94 pen-raised pheasants liberated on an 800-acre State Game Refuge. The area lacked adequate cover and food and was heavily populated with predators. Most of the released birds dispersed rapidly and the remainder were depleted by predators or driven out by resident wild pheasants. Only one pen-raised cock persisted and only one of the restocked hens is known to have nested.

Management: Waterfowl

Hawkins, Arthur S., Frank C. Bellrose, Jr., and Harry G. Anderson. The waterfowl research program in Illinois, Illinois Natural History Survey (Urbana) Biological Notes 12, 16 pp., 1 fig., 8 tables (mimeographed), Oct. 1939.

Notes on kinds of work undertaken and reports on 2 branches of it, namely, a survey of the 1938 hunting season, and a study of foods and food habits of waterfowl. A paper on the former topic by Hawkins and Bellrose was abstracted in WILDLIFE REVIEW, No. 22, August 1939, p. 32, from which the present article differs in some respects. Total kill, including cripples lost, is estimated at 85,000. The proportion of male to female mallards increased through the season from 48 percent in the first half-month to 62 percent in the last. Average weights of mallards were: drakes 42.8, and ducks, 37.2, ounces

Aquatic vegetation, unfavorably affected by drouth in 1938, improved in 1939; details of the findings are given for a number of bodies of water. A preliminary report is made on food habit studies. In 285 mallard stomachs, corn comprised 40 percent, and Leersia oryzoides 13 percent, of the food. Leading items in 62 pintail stomachs were: corn, 56 percent; Cyperus esculentus, 8, and Cephalanthus occidentalis, 6. Briefer mention is made of the food of lesser scaup, and ring-necked, ducks. "The belief, sometimes expressed, that baiting is necessary to prevent duck starvation, does not apply to Illinois conditions."

The authors' remarks on the waterfowl crop are of interest. "The goal of game management is the ethical harvesting of the surplus. A surplus is that part of a population in excess of a breeding stock large enough to maintain the species at some desired population level. In waterfowl at the present time, there is no surplus, because the desired population level is not in sight. We are, therefore, harvesting a portion of the capital stock. Although this is not good management, under the circumstances, it is the best thing to do. It means, however, that unusual vigilance must be directed toward the status of the capital stock, to guard against sharp deflation."

Management: Winter feeding

Benjamin, J. R. Foods, feeding, and feeders, Ohio Conservation Bul. (1106 State Office Bldg., Columbus, Ohio, 10 cents a copy), 3(12), Dec. 1939, pp. 3-4, illus.

Food should be available early and late, should be suitable and sufficient, and should not unduly expose the population being fed to predator attacks. Food patches are better than feeding stations but provision should be made for both. Planting of natural food-bearers also should not be neglected. Suggestions are made as to the best foods and methods of making them available, and a number of feeding devices are illustrated.

Natural History: Armadillo

Taber, F. Wallace. Extension of the range of the armadillo, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(4), Nov. 1939, pp. 489-493, 2 maps.

Range at different periods since 1880; it has extended steadily in Texas and recently has involved several other States for which records are cited. Bibliography of 6 titles.

Natural History: Birds of Newfoundland

Aldrich, John W., and David C. Nutt. Birds of eastern Newfoundland, Cleveland Mus. Nat. Hist. (Cleveland, Ohio), Scientific Publ. 4(2), pp. 13-42, Dec. 1939.

Annotated list of 93 forms, of which a chickadee, Penthestes atricapillus bartletti, and a robin, Turdus migratorius nigrideus, are described as new. Bibliography of 31 titles.

Natural History: Forest wildlife

Palmer, E. Laurence. Farm-forest facts, Cornell Rural School Leaflet (Cornell University, Ithaca, N. Y.), 33(2), Nov. 1939, 32 pp., 1 pl., 4 portraits, 6 figs., 14 cartoons, 2 tables.

Wildlife is discussed under the heads of: Forests and furs (economic value, take for alternate years 1927-38, study suggestions); forests and feathers (occurrence and kill of ruffed grouse, management suggestions); and forests and flesh (food value of forest animals, possible income from lease of hunting rights).

Natural History: Herpetology of Great Smoky Mountains National Park

King, Willis. A survey of the herpetology of Great Smoky Mountains National Park, American Midland Naturalist (Notre Dame, Indiana. $1.00 a copy), 21(3), May 1939, pp. 531-538, 9 figs., tables.

Annotated list of 70 species, including 25 salamanders, 11 frogs and toads, 8 lizards, 21 snakes, and 5 turtles. Bibliography of 40 titles.

Natural History: Herpetology of Oregon

Gordon, Kenneth. The amphibia and reptilia of Oregon, Oregon State College (Corvallis) Studies in Zoology, No. 1 (50 cents a copy), 82 pp., 7 pls., 37 figs., May 1939.

Misconceptions relative to reptiles and amphibians, distributional area of the State and their herpetological faunas, habitat distribution, life histories, economic importance, and treatment of snake bites. Illustrated key and running accounts (including description, habitat, and range) of 14 species of salamanders, 11 of toads and frogs, 14 of lizards, 23 of snakes, and 2 of turtles.

Natural History: Herpetology of Pennsylvania

Parling, R. Clift. The amphibians and reptiles of Union County, Pennsylvania, Herpetologica (Walter L. Necker, 2001 N. Clark St., Chicago, Ill. 50 cents a copy), 1(6), 1939, pp. 165-169.

Annotated list of 24 species of amphibians and 22 of reptilians.

Natural History: Herpetology of Southwest

Cowles, R. B., and C. M. Bogert. The herpetology of the Boulder Dam Region (Nev., Ariz., Utah), Herpetologica (Walter L. Necker, 2001 N. Clark St., Chicago, Ill. 50 cents a copy), 1(2), December 1936, pp. 33-42.

Annotated list of 7 amphibians, 19 lizards, 13 snakes, and 2 turtles.

Natural History: Herpetology of West Virginia

Green, N. Bayard. The amphibians and reptiles of Randolph County, West Virginia, Herpetologica (Walter L. Necker, 2001 N. Clark St., Chicago, Ill. 50 cents a copy), 1(4), Nov. 1937, pp. 113-116.

Annotated list of 24 species of amphibians and 20 of reptiles.

Natural History: Mammals

Hamilton, W. J., Jr. American mammals. Their lives, habits, and economic relations. xii+434 pp., frontis.+92 figs., 1939 (McGraw-Hill Book Co., Inc., 330 West 42nd St., New York, N. Y. $3.75 a copy).

The author, an earnest student of mammals, who has contributed more than anyone else to knowledge of their food habits, is certainly qualified to prepare a good book on these animals and has done so. The approach is broadly ecological and the style that of a text-book, with lists of literature cited ending the chapters. The latter, numbering 18, treat ancestry, classification, adaptations, food, storage, reproduction, homes, hibernation, migration, populations, behavior, distribution, and economics. Sections probably of most interest to wildlife managers are those on food and storage (about 65 pp.), good general accounts that the author is eminently qualified to write, that on mammal populations, a subject which also has engaged some of his special research, and the chapters on economics, on which he has often written before. These relate to useful and injurious mammals, game and fur groups, and predators, all discussed both as to conservation and control. The book has an ample index.

Natural History: Mammals of Arizona

Cahalane, Victor H. Mammals of the Chiricahua Mountains, Cochise County, Arizona, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(4), Nov. 1939, pp. 418-440, 2 pls.

Annotated list of 64 species and subspecies; hypothetical list of 9; bibliography of 15 titles.

Natural History: New York wildlife in winter

Palmer, E. Laurence. Fields in winter, Cornell Rural School Leaflet (Cornell University, Ithaca, N. Y.), 33(3), Jan. 1940, 28 cartoons, 3 tables.

Analysis of the farm environment in relation to wildlife; nature and value of food and cover; how wildlife passes the winter; animal tracks; take and economic value of common game and fur animals, with some account also of non-game species.

Natural History: Snails of Illinois

Baker, Frank Collins. Fieldbook of Illinois land snails, Illinois Natural History Survey (Urbana) Manual 2, xi+166 pp., 4-1/4x7-1/8", illus., Aug. 1939.

Introductory chapters relate to the habits and habitats of snails, methods of collecting, preserving and identifying the animals, and to the history of the group and of its study in Illinois. Keys are given to all taxonomic divisions from families to varieties. The total number of forms treated is 122, and practically all of them are described and illustrated.

Natural History: Whales

Kellogg, Remington. Whales, giants of the sea, National Geographic Magazine (Hubbard Memorial Hall, Washington, D. C. 50 cents a copy), 77(1), Jan. 1940, pp. 35-90, 24 col. pls., numerous photos.

General account of whales and their commercial uses, and essays treatir 36 groups of whales, dolphins, porpoises, and the narwhal, with respect to dis tribution, size, young, habits, food, diving ability, swimming speed, etc.

Propagation: Feeding fur animals

Kellogg, Charles E. Nutrition of fur animals, Yearbook U. S. Dept. of Agriculture 1939 (Supt. of Documents, Washington, D. C. $1.50 a copy), pp. 871-892, 2 pls., 9 tables.

Summary of the status of fur farming; accounts of the management includ ing feeding, and the results of dietary research, of silver foxes and minks. Briefer treatment is given martens and fishers, and a section is devoted to domestic rabbits.

Propagation: Feeding gallinaceous game birds

Nestler, Ralph B. Feeding requirements of gallinaceous upland game birds, Yearbook U. S. Dept. of Agriculture 1939 (Supt. of Documents, Washington, D. C. $1.50 a copy), pp. 895-924, 11 figs., 8 tables.

Brief account of the gallinaceous game birds, both native and introduce now in the United States and of the extent of their propagation. Notes on the food habits of the birds in the wild, with table summarizing information on 8 species. The desirability of providing food patches and feeding shelters is pointed out and suggestions are given as to their establishment and maintenanc Studies of the nutritional requirements, especially as to vitamins and mineral of gallinaceous game birds under controlled conditions are summarized, and modern feeding practices are described.

Propagation: Winter feeding of pheasants

Jurale, Bernard. Wintering game pheasants, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa. 25 cents a copy), 10(1), Jan. 1940, pp. 6-7.

Inadequate winter feeding affects the appearance and performance of birds in the breeding season. The author reports on trial of various systems and concludes that an essential to proper diet is plenty of roughage, to take the place of the grass and other plants available in summer. He found the buds and bark of apple prunings and the leaves and even the stalks of corn fodder to be eaten.

Research: Activity recording

Spencer, Donald A. Electrical recording of the activities of small mammals, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 20(4), Nov. 1939, pp. 479-485, 7 figs. (1-3 on a plate).

Activity-recording machines are useful in connection with the planning of control measures. Illustration and description of a recorder, discussion of difficulties and methods of surmounting them. Suggestions as to the use of the apparatus in life-history studies.

Research: Banding

Mason, Edwin A. The amateur bird bander, Natural History (American Museum of Natural History, New York, N. Y. 50 cents a copy), 44(3), Oct. 1939, pp. 149-154, 11 photos.

Well illustrated popular account of bird banding as cooperated in by the Biological Survey, a few other organizations, and many individuals. General instructions and illustration of sample equipment and methods.

Research: Banding, pheasants

Kellogg, H. B., Jr. Pheasant banding statistics, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(12), Dec. 1939, pp. 49-51.

Of 4,844 bands returned, 4,507 were for pheasants stocked in 1938, 298 in 1937, and 30 in 1936; scattering returns represented birds banded as far back as 1929. Of the total birds upon which returns were made, 86.2, mostly young cocks, were shot during the open season. Out of 37.6 percent, for which information as to drift was available, about half were taken within 5 miles of the stocking site; long travels were 60 and 78 miles.

Research: Banding, woodcocks

Norris, Russell T., John D. Beule, and Allan T. Studholme. Banding woodcocks on Pennsylvania singing grounds, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 8-14, 1 pl., 1 fig.

"A fairly heavy concentration of breeding woodcocks (Philohela minor) was found in the scrub oak-pitch pine forest type of central Pennsylvania. Forty singing grounds were found on the 950 acres investigated. To observe th singing male's reaction to an intruder, a woodcock was collected and mounted i standing position. This decoy was placed on a singing ground, where the resident male attempted to copulate with it 21 times during the evening flight period. After subsequent observations it was evident that all birds would not react similarly in the presence of the decoy; but of the 27 singing males that actually saw the mounted bird, 20--or 74 percent--attempted copulation the first night. The actions of the remaining seven may be attributed to several trapping technique defects. Plans for trapping the adult males on their singing grounds through the use of the decoy gradually evolved, and finally a No. jump trap with enlarged jaws covered with gill netting was found to be satisfactory. Fourteen males were trapped and banded during the singing season. The trapped birds were not greatly frightened by the procedure and soon return to normal singing activities."--Logan J. Bennett.

Research: Cooperative, in Iowa

Scott, Thomas G. Progress report of the Iowa Cooperative Wildlife Research Unit, October 1935 to October 1939, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 28(6), Nov.-Dec. 1939, pp. 271-281, 9 photos, 1 table.

The fundamental objectives of the undertaking were: "(1) Development o practicable and efficient census techniques; (2) study of the economic importance of the various forms of wildlife, especially as affected by population fluctuations and differences in environment; (3) investigation of the limiting factors that tend to decrease or increase wildlife populations; and (4) development and testing of techniques and practices." A summary is given of results with the ring-necked pheasant, bob-white, mourning dove, blue-winged teal, coot, cottontail, muskrat, red fox, two species of skunks, and raccoon. There are notes also on less advanced studies and a tabulation recording the names of projects and investigators and the periods of investigation.

Research: Irradiation studies

Bissonnette, Thomas Hume. Sexual photoperiodicity in the blue jay (Cyanocitta cristata), Wilson Bul. (Josselyn Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 51(4), Dec. 1939, pp. 227-232, Pls. 9-11.

Author's summary: "(1) The male Blue Jay is sexually photoperiodic and responds to increased illumination in December by almost, if not quite, com-

plete spermatogenesis and activation of the epididymis to breeding condition in twenty-eight days; (2) females also respond, but more slowly and less completely. Oviducts increase markedly in size and activity in a majority if not all experimentally lighted females; (3) exact uniformity of stages of activity of germ cells was not found in males taken from the wild within ten minutes of each other in March nor in experimentally activated birds at time of killing. This is also true of females; (4) larger germ cells and nuclei and smaller size of testes in Blue Jays than in Starlings make them easier to treat technically and study microscopically; (5) Blue Jays are hardy, easily kept and fed in captivity, and temperamentally good for experimental work."

Research: Metabolic rate in mice

Hatfield, Donald M. Rate of metabolism in Microtus and Peromyscus, The Murrelet (105 Anderson Hall, University of Washington, Seattle. 50 cents a copy), 20(3), Sept.-Dec. 1939, pp. 54-56, 2 tables.

Description of apparatus and method of experiment; measured by carbon dioxide output, meadow mice have a higher metabolic rate than do white-footed mice.

Research: Metabolism of turkey strains

Gerstell, Richard, and William H. Long. Physiological variations in wild turkeys and their significance in management, Pennsylvania Game Commission (Harrisburg) Research Bul. 2, 60 pp., 10 figs., 21 tables, 1939.

Gerstell, Richard. The inherent "wildness" of different strains of wild turkeys, pp. 1-19, 6 figs., 3 tables.

Strains of turkeys differ appreciably in "wildness" and the wilder types are more suitable for stocking as game. This bulletin reports on a physiological study of two strains, comparing them in their stages of development under both outdoor and laboratory conditions. Wildness is a result not only of parental education, association with other individuals, and reactions to environmental stimuli, but also of hereditary factors. Bibliography of 7 titles.

Long, William H. The heat production and muscular activity of two strains of wild turkeys, pp. 20-60, 4 figs., 18 tables.

This paper deals with an experimental study of the metabolism of the two strains, including the effects of fasting, activity, and age. Comparisons are given also of heat production, body temperature, rate of respiration and heartbeat, and the relations between body weight and organ weight of various birds and mammals. Apparatus and technique are described. Bibliography of 88 titles.

Research: National parks, southwest

McDougall, W. B. Wildlife management, National Park Service Region III (Santa Fe, N. Mex.), Quarterly, 1(2), Oct. 1939, pp. 36-40, 1 pl.

The goal of the Wildlife Division is "the restoration, preservation, and presentation to the public of complete biotic communities in all park areas." Research is needed and some of its particular requirements in the Southwest are pointed out. Problems for immediate as well as others for long-time investigation are suggested.

Research: Respiration apparatus

Long, William H. Apparatus for measuring metabolism and activity in wild animals, University of Michigan School of Forestry and Conservation Circular 5 (University of Michigan Press, Ann Arbor. 25 cents a copy), 35 pp., 5 figs, 1 table, 1939.

Description and illustration of apparatus making it "possible to observe and record automatically the effects of either constant or fluctuating temperature, humidity, and light on the animal's internal temperature, heat regulation head production, heat loss, neuromuscular reaction, digestion, body weight, oxygen consumption, carbon-dioxide production, and water vaporized, without touching the animal during the experimental period." Bibliography of 36 titles

Research: Rooting woody plants

Yeager, Lee E., and L. R. Tehon. Experiments with plant hormones in the propagation of wildlife food and cover, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C. 75 cents a copy), 4(1), Jan. 1940, pp. 1-7, 4 tables.

Authors' abstract: "About 350 cuttings each of dormant bittersweet, frost grape, red mulberry, and hawthorn were treated with Auxilin, Hormodin, and potassium permanganate solutions to determine the effect of these materials in stimulating root growth. Auxilin and Hormodin were used at the strength recommended by the manufacturers; potassium permanganate at the rate of 0.89 gram per 1,000 milliliters. The rooting medium was quartz sand and peat moss in nearly equal volume, placed in an ordinary greenhouse bench. The rooting period was 100 days, from December 20 to April 1. Bittersweet responded well to treatment with both Auxilin and Hormodin but hardly at all to potassium permanganate. Frost grape responded to treatment with potassium permanganate but was inhibited by Auxilin and Hormodin. Red mulberry responded slightly to Auxilin and potassium permanganate but was unaffected by Hormodin. Hawthorn cuttings were not affected by any of the treatments."

Readers wishing to pursue this subject further may appreciate references to 3 articles by H. H. Grace, et al in the Canadian Journal of Research (National Research Council, Ottawa), 17, C (10), Oct. 1939, pp. 318-338. These relate chiefly to the responses of dormant cuttings to indolyacetic acid, ethyl mercuric phosphate, cane sugar, and nutrient salts.

Research: Study cage

Wright, Bertrand A. The drop-bar activity cage, Turtox News (761-763 East 69th Place, Chicago, Ill.), 18(1), Jan. 1940, pp. 19-20, 2 photos.

For study of the periods of activity, especially of reptiles and amphibians both in laboratory and field, the author discarded electrical devices as too expensive and cumbersome and resorted to mechanical means of recording activity. The cage developed is described and illustrated.

Soil Conservation Service

Anon. New Soil Conservation Districts provide for managing farm game, Virginia Wildlife (Blacksburg, Va.), 3(3), Nov. 1939, pp. 1, 7.

Six districts, covering 19 counties, have already been organized in Virginia. Provisions of a typical work plan relating to wildlife are quoted.

Soil Conservation Service: Annual Report 1938-39

Bennett, H. H. Report of the Chief of the Soil Conservation Service, 1939, 78 pp., 18 tables (Supt. of Documents, Washington, D. C. 15 cents a copy).

Progress in restoration of wildlife habitat as part of the erosion control program is recorded on pages 35-37. The most beneficial practices are listed; pond development, beaver stocking, increased use of herbaceous vegetation, hedgerow management, and some of the effects of the work upon wildlife are discussed.

WILDLIFE LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of the Interior, Washington, D. C.

BS-146. Lake Mattamuskeet Wildlife Refuge, 2 pp., October 1939.

History and description of this 50,000 acre reservation in North Carolina; notes on hunting and fishing privileges, and on the principal waterfowl of the refuge.

BS-148. Status of the American bison in the United States and Alaska, 1939, 10 pp., 1 table, December 1939.

Number of the animals in the United States and Alaska, 5,029 (1939), an increase of 579 over the 1934 estimate. A five-page tabulation shows the location and ownership of herds, the number of males, females, and calves they included, and State, United States, and Alaska totals. Bibliography of 50 titles.

BS-149. Protecting field crops from waterfowl damage by means of reflectors and revolving beacons, by F. M. Uhler and Stephen Creech, 5 pp., 1 pl., November 1939.

Account of experiments in protecting buckwheat, rice, and lettuce by means of spinning reflectors and revolving beacons, the construction and use of which are described. The plate illustrates details of the devices.

NOTES AND NEWS

The Colorado State College Library (Fort Collins) has issued as its Bulletin 6, "The memoirs of Estes Park" by Milton Estes. The publication gives information on the locality and its wildlife during the period 1859-66.

Papers presented at the Third Northeastern Wildlife Conference in connection with the Eleventh Annual New England Game Conference, February 3-4, 1939. Mimeographed copies of all (10) of these are available at a cost of 25 cents per set; remittance should be made to David A. Aylward, 20 Spruce St., Boston, Mass. Four of the articles relate to fishes and one to conservation law; the other 5 are briefly abstracted herewith:

Webb, William L. The new program of the Roosevelt Wildlife Forest Experiment Station, New York State College of Forestry at Syracuse University, 5 pp.

Account of the establishment of the Station, its facilities, and research and educational programs, and its publications.

Greene, Willard C. Multiple blood parasites in waterfowl, 4 pp.

One bacilliform and three protozoan parasites found in the blood of black ducks on Cape Cod, Mass. Evidently subnormal ducks are likely to be those infested with blood parasites which bring on anemia, toxemia, malnutrition, lowered resistance to other diseases, and loss of strength and of abilit to migrate, nest, and reproduce.

Hosley, N. W. The place of foods in New England wildlife management, 8 pp.

Much the same paper as abstracted in WILDLIFE REVIEW, No. 22, August 1939, p. 20, but with a somewhat fuller discussion of nutritional details, and a bibliography of 10 titles (3 others incomplete).

Morton, James N. Stepping up game production in Pennsylvania, 11 pp.

Modern developments including clean farming, increased posting of land, and growth in the number of hunters have intensified the problems of State gam departments. The Pennsylvania organization is endeavoring to meet the situation by improving environments, bettering farmer-sportsman relationships, and readjusting the stocking program. Progress in each of these activities is discussed.

Miller, J. Paul. The Pittman-Robertson program and what it means to conservation, 6 pp.

Brief history of the legislation, abstract of its provisions, types of projects eligible for aid and conditions governing their approval; requirement as to technically trained personnel, supervision, and maintenance; brief description of projects approved in Northeastern States; necessity for cooperation of all interests involved.

Feeling that more light might well be had upon the tabulation "Take of certain mammals in New York State," reproduced in WILDLIFE REVIEW, No. 24, November 1939, p. 38, the compiler of the REVIEW appealed to the Conservation Department at Albany. Most of the reply by Robert W. Darrow is here quoted:

Our figures of reported take, of course, are not accurate as regards the actual number killed. They do, however, present a fairly sound indication of trend, which becomes more accurate when the figures are reduced to a take-per-license basis. When examined from this standpoint, it seems clear that, except for the muskrat, the various fur-bearers have been maintaining themselves or somewhat increasing since 1928, and especially since 1930.

It is unfortunate that Dr. Palmer chose 1927 as the year for which to give his initial figures, since for some unexplained reason the take of practically all the species was very markedly higher during this year than for a number of years before or any year since. An important consideration in analyzing these trends is the fact that during the 20's the fur market was at a very high level and greatly encouraged trapping; while since 1930 the reverse has largely been true. Another factor is that until the coming year, New York has not had a separate trapper's license.

Therefore, in figuring the take per license, all hunting licenses are included in the computation. I believe that since the 20's, the number of people taking out such licenses for purely hunting purposes have increased to a far greater degree than has the number of trappers. Therefore, it is possible that if we knew the actual number of trappers, the trend of the take among the fur-bearers would be considerably more favorable.

In any case, however, the abundance of muskrats does seem to have definitely decreased. How much of this may be attributable to draining and other operations which destroy muskrat range, we do not know. We are anticipating the establishment under the Pittman-Robertson program of a project dealing with fur-bearers, and hope that as a result of it, we will be able to build up a picture of just what these conditions actually are.

The otter, fisher and marten, as you undoubtedly know, were given a continuously closed season beginning in 1937.

Regarding cottontails and hares, it seems quite evident that a low point in their abundance was experienced between 1934 and 1937. They have now recovered to a considerable degree.

STATISTICS CONCERNING THE REPORTED TAKE OF CERTAIN GAME SPECIES IN NEW YORK, 1926-1937

Numbers Reported

Year	Red fox	Gray fox	Skunk	Mink	Muskrat	Raccoon	Opossum	Rabbit	Hare	Number of Hunting & Fishing Licenses
1926	18,726	2,402	75,648	8,328	274,242	28,750	1,926	733,462	51,434	351,260
1927	35,658	2,338	120,002	9,612	553,270	40,908	1,086	797,750	52,002	371,983
1928	10,616	2,259	72,673	7,133	347,113	27,886	1,328	564,792	49,036	369,054
1929	10,913	2,775	74,850	6,634	284,791	24,230	1,538	825,723	53,983	385,786
1930	8,644	2,652	53,541	5,481	202,731	20,820	1,129	902,239	52,881	391,622
1931	8,118	2,806	56,338	5,518	203,029	18,813	1,363	783,344	55,562	314,972
1932	7,697	3,443	44,905	4,641	170,073	18,686	1,169	876,203	64,531	287,147
1933	9,278	3,527	51,063	4,890	180,305	13,939	2,065	906,200	41,461	277,463
1934	9,009	4,935	52,988	6,509	149,352	20,304	2,516	835,625	32,328	284,283
1935	11,229	4,757	33,247	5,488	148,024	23,427	2,296	779,340	24,053	290,795
1936	10,593	4,247	42,669	5,608	165,825	26,921	2,908	597,966	23,953	298,623
1937	15,550	4,980	36,701	5,722	157,494	24,190	3,041	768,431	32,540	339,807

Reported Take Per License

1926	.053	.007	.209	.024	.782	.081	.005	2.086	.146
1927	.096	.006	.324	.026	1.489	.110	.003	2.142	.139
1928	.029	.006	.197	.019	.940	.076	.004	1.529	.133
1929	.028	.007	.194	.017	.739	.063	.004	2.141	.140
1930	.022	.007	.137	.014	.520	.053	.003	2.303	.135
1931	.026	.009	.178	.017	.644	.060	.004	2.480	.176
1932	.027	.012	.156	.016	.593	.065	.004	3.049	.225
1933	.033	.013	.184	.018	.650	.050	.007	3.268	.149
1934	.032	.017	.116	.023	.526	.072	.009	2.838	.114
1935	.039	.016	.114	.019	.509	.081	.008	2.678	.083
1936	.035	.014	.143	.019	.555	.090	.010	2.002	.080
1937	.046	.016	.119	.019	.464	.071	.089	2.488	.096

The report of the Ohio Cooperative Wildlife Research Station for the fiscal year 1938-39 was received during the holiday period. It is Release No. 118 of the Station at Columbus, Ohio, and comprises 11 mimeographed pages. The report lists the places at which work is being done, and gives a roster of the staff and a directory of men formerly associated with the unit, mentioning their present employment. The status of research projects is shown in a tabulation, educational activities are summarized, and publications and manuscript reports on the work cataloged.

"Wildlife in the Farm Program," by James N. Morton (Bul. 16, Pennsylvania Game Commission, Harrisburg), abstracted in WILDLIFE REVIEW, No. 15, July 1938, pp. 26-27, has recently been reprinted for the third time. The four editions total 95,000 copies.

A prominent zoologist and biometrist recommends the following books on statistical theory and practice from the point of view of the biologist. They are named in the ascending order of their complexity:

Pearl, Raymond
Introduction to medical biometry and statistics, 2nd Ed., 459 pp., illus., 1930. W. B. Saunders Co., Philadelphia, Pa.

Simpson, George G., and Anne Roe
Quantitative zoology; numerical concepts and methods in the study of recent and fossil animals, xvii+414 pp., illus., 1939. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York, N. Y.

Yule, George U., and M. G. Kendall
An introduction to the theory of statistics, 11th Ed., xiii+570 pp., illus., 1937. C. Griffiths & Co., Ltd., London, England.

A recent review highly recommends an additional book, saying, "No better work is available for the beginner." The reference is:

Snedecor, George W.
Statistical methods, xiii+388 pp., illus., 1938. Collegiate Press, Ames, Iowa.

The Quarterly Bulletin of the American Nature Association has been replaced by leaflets on green paper printed as an integral part of Nature Magazine (1212 Sixteenth St., N. W., Washington, D. C.). The first such brochure by E. Laurence Palmer was abstracted in WILDLIFE REVIEW, No. 24, November 1939, p. 16, and the second by William M. Rush in the present issue, p. 3.

"A pamphlet about pamphlets," by Lester Condit (University of Chicago Press, 104 pp., lithoprint, 1939, 75 cents a copy), may be of interest to many readers of WILDLIFE REVIEW. It defines pamphlets in a chiefly historical treatment, and suggests methods of preserving, arranging, and cataloging them. There is a bibliography of references pertaining to each chapter of the brochure, and an indexed list of manufacturers and dealers in library supplies.

The Houghton Mifflin Company (2 Park St., Boston, Mass.) announces publication under the editorship of Dr. John B. May of a revised edition of Forbush's "Birds of Massachusetts." Accounts of more than 100 species have been added and the title correspondingly changed to "Natural History of the Birds of Eastern and Central North America." The book runs to 600 pages, has 96 colored plates; the price is $4.95.

Al Belair, Minneapolis, Minnesota, is distributing a small tract entitl "Know your crow, its habits and control" in which, although damage by the bird is stressed, moderation in control is urged. The price is 10 cents per copy.

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WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
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Washington, D. C. No. 27 May, 1940

Bibliography: Birds

Strong, Reuben M. A bibliography of birds, with special reference to anatomy, behavior, biochemistry, embryology, pathology, physiology, genetics, ecology, aviculture, economic ornithology, poultry culture, evolution, and related subjects, Field Museum of Natural History (Chicago, Ill.) Zoological Series, Vol. 25, Part 1, Author Catalogue A to J, pp. 1-464; Part 2, Author Catalogue K to Z, pp. 465-937, 1939. Part 3 containing the subject index is in press. Price for the three parts, postpaid, $11.00.

An outgrowth of the author's original bibliography on bird morphology, this work is largely non-taxonomic and relates especially to anatomy, physiology, ecology, and behavior. Paleontology, parasitology, aviculture, and migration in addition, however, are not ignored. Volume 1 includes a key list of abbreviations for periodicals cited (pp. 17-72), and a list of periodicals not cited but relating to birds (pp. 73-82). In both volumes, symbols indicate libraries in which many of the works listed may be found. A monumental task, well done; completeness, however, was not aimed for and should not be expected. A literally complete bibliography unavoidably would include references of little value.

Bibliography: Ecology

Carpenter, J. Richard. Recent Russian work on community ecology, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 8(2), Nov. 1939, pp. 354-386.

History of ecological studies in Russia, statement of present organization for these researches, discussion of concepts and theories, and bibliography of 517 titles.

Classification: Fleas

Fox, Irving. Fleas of eastern United States, Iowa State College Press (Ames), vii+191 pp., 31 pls., Feb. 1940 ($3.00 a copy, postpaid).

The introductory chapter discusses the collection and preservation, morphology and terminology, and life history and control of fleas. The remainder of the book is a systematic treatment, including keys from suborders to species, synonymy, and citations to the literature of all groups, and descriptions, illustrations, and locality and host records for 55 species. This the first comprehensive treatment of American fleas since 1904, should be of considerable value to students of animal diseases.

Conservation

Poe, J. Charles. Wildlife conservation in Tennessee, Educational Publication No. 1 (Dept. of Conservation, Nashville, Tenn.), 14 pp., n. d., mimeographed.

History of the exploitation of natural resources of the State. To be effective, conservation of all of them must proceed simultaneously. National and State organizations for conservation are described and some of their currently available publications listed.

Conservation: Dove, Mourning

Palmer, C. M., Jr. Mourning dove menaced, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 29(1), Jan.-Feb. 1940, pp. 45-47.

Sketching a background of the fate of the passenger pigeon, the author emphasizes care to preserve the mourning dove. Its desirability as a game bird, its habits, and useful economic status are briefly summarized. Its multiple brood production, prolonging the breeding season past the customary date for the opening of the hunting season, imposes a problem in management which the writer thinks can be solved by education and gradual action.

Conservation: Murre

Johnson, R. A. Present range, migration, and abundance of the Atlantic murre in North America, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass. 75 cents a copy), 11(1), Jan. 1940, pp. 1-17, 1 map, 1 table.

Location and size of recent breeding colonies, notes on migration, winter range, and winter populations, especially as elucidated by banding. The total breeding population is some 60,000 birds. Eggers who collected eggs for the Boston market 80 to 100 years ago together with local marauders reduced the murre population about 95.5 percent up to the time that the Canadian Government created sanctuaries for the birds. They are now increasing on the refuges.

Control: Predators

Green, D. D. Controlling predatory animals, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 29(1), Jan.-Feb. 1940, pp. 35-40, 3 photos.

Predator control in America pursuant to legislation dates from 1630. Its necessity has continued longer in the sparsely settled West than in the East and urgent requests resulted first in investigation of the problem, and in 1914 in a small appropriation by Congress for experiments and demonstrations. A considerably larger allotment the next year enabled the Biological Survey to take over the work along this line that had been carried on by the Forest Service. In that year 14,072 predators were killed. Organization and methods have been improved to handle the problem in 11 western range States totalling 761,000,000 acres, nearly half of which is public domain. In illustration of losses is cited the Forest Service report that in 1936, 78,404 sheep and goats were killed by predators on national forests in the United States during the summer grazing season of about 3 months. Despite control

operations, coyotes seem to be both increasing and spreading. Improved methods are a great need and are being sought. In contrast the control of the wolf, bobcat, bear, and mountain lion is local in character and readily accomplished with adequate personnel. Criticisms of the work are discussed and the results of investigations cited.

Control: Water chestnut

Hamill, J. S. Deadly water chestnut chokes Potomac, Outdoor America (1167 Merchandise Mart, Chicago, Ill. 10 cents a copy), 5(3), Jan. 1940, pp. 4-5, 3 photos.

Spread of the plant, suppression of other vegetation of more value to wildlife, description, illustration, and life history of water chestnut; steps being taken in control.

Cycles: Arctic animals

Chitty, Dennis. Canadian Arctic wild life enquiry, 1937-38, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 8(2), Nov. 1939, pp. 247-260, 4 maps, 2 tables.

Third report in this series, the second of which was noticed in WILDLIFE REVIEW, No. 19, April 1939, p. 12. Data are summarized on increase and decrease of lemmings, arctic foxes, and snowy owls, and upon "distemper" among sledge dogs.

Cycles: Hare, Snowshoe

Green, R. G., and C. A. Evans. Studies on a population cycle of snowshoe hares on the Lake Alexander Area. I. Gross annual censuses, 1932-1939, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 220-238, 4 figs., 9 tables.

Authors' abstract: "An intensive study of populations of the snowshoe hare (Lepus americanus) has been pursued since 1931 on the Lake Alexander Area, a tract of about six and one-half square miles in Morrison County, Minnesota. Calculations are based on systematic trapping and banding operations carried on during the months of November through April since 1932. Field observations made before trapping and banding procedures were instituted showed that snowshoe hares were not common on the Lake Alexander Area in 1928. The population gradually increased in the course of the next few years to a maximum calculated population of 500 hares to the square mile in 1935. During the next two years a moderate focal decline in the numbers of hares occurred on some parts of the area. From 1935 through 1938 there was a continuous, sharp decline until the number of hares was only about 10 per cent of the peak population. The beginning of recovery from the decimation was marked by an increase in numbers of hares in 1939 to about twice the population in 1938. These changes in population coincided with parallel changes in numbers of hares observed in other

parts of Minnesota and in Wisconsin and may be considered representative of the periodic fluctuations in population to which these animals are subject. It was estimated that a winter mortality of about 50 per cent occurred during a period of ten weeks in each of two successive years. An analysis of the error of random sampling entailed in calculating yearly populations is presented.

Diseases and Parasites: Blood parasites

Herms, W. B., C. G. Kadner, P. Galindo, V. Armstrong, and D. F. Armstrong. Blood parasites of California birds, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 511-512.

Report on examination of 150 birds embracing 30 species of which 41 of 6 species were found infected; records of infection by Plasmodium, Haemoproteus, Trypanosoma, and microfilariae are given, and also a list of the uninfected birds.

Diseases and Parasites: Cestoda, Diorchis

Long, L. Helen, and Nelson E. Wiggins. A new species of Diorchis (Cestoda: Hymenolepididae) from the canvasback, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 483-486, 1 pl.

D. nyrocae n. sp. from Oklahoma; description, illustration, comparative notes, and list of known species of the genus.

Diseases and Parasites: Cestoda, Oochoristica

Peery, Harold J. A new unarmed tapeworm from the spotted skunk, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 487-490, 1 pl.

Oochoristica oklahomensis; description, illustration, comparative notes, list of species of the genus from mammal hosts; bibliography of 6 titles.

Diseases and Parasites: Oochoristica

Steelman, Gerald M. Oochoristica whitentoni, a new anoplocephalid cestode from a land tortoise, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 479-482, 1 pl.

In Terrapene triunguis from Oklahoma; description, illustration, and comparative notes.

Diseases and Parasites: Cestoda, Tatria

Olsen, O. Wilford. Tatria duodecacantha, a new species of cestode (Amabiliidae Braun, 1900) from the pied-billed grebe (Podilymbus podiceps podiceps (Linn.)), Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 495-499, 1 pl.

From Iowa; description, illustration, comparative notes; key to 5 known species of the genus; bibliography of 6 titles.

Diseases and Parasites: Eimeria

Honess, Ralph F. The coccidia infesting the cottontail rabbit, Sylvilagus nuttallii grangeri (Allen), with descriptions of two new species, Parasitology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 18 shillings 6 pence a copy), 31(3), Sept. 1939, pp. 281-284, 3 figs., 1 table.

Brief notes on technique; accounts of 4 species of Eimeria, 3 illustrated, and 2 new (E. maior and E. environ presumably from Wyoming); the table compares characters of 8 species and one variety of the genus; bibliography of 7 titles.

Diseases and Parasites: Gastroenteritis

Waller, E. F. Infectious gastroenteritis in raccoons (Procyon lotor), Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(755), Feb. 1940, pp. 266-268.

Account of an infectious malady of captive raccoons in Iowa; course of the disease, necropsies and experimental studies of it. It was similar to, if not identical with, gastroenteritis of cats, the causative organism of which is Escherichia coli communior.

Diseases and Parasites: Malaria

Gambrell, Elizabeth. Avian malaria, The Oriole (Emory University, Ga.), 4(4), Dec. 1939, pp. 57-58.

Popular article describing the disease and its transmission and reviewing recent findings as to malaria in birds of the United States. It is suggested that the malady is most destructive to young birds.

Diseases and Parasites: Nematoda, Dracunculus

Benbrook, E. A. The occurrence of the guinea worm, Dracunculus medinensis, in a dog and in a mink, with a review of this parasitism, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(755), Feb. 1940, pp. 260-263, 1 photo.

Review of literature, of which 23 titles are cited; wild animals from which the parasite (an enormous nematode) have been reported include the fox and mink. Description of the worm, infections by it, and treatment.

Diseases and Parasites: Nematoda, Skrjabingylus

Hill, William C. The nematode Skrjabingylus chitwoodorum n. sp. from the skunk, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 475-478, 1 pl.

In Mephitis and Spilogale from Oklahoma; description, illustration, comparative notes.

Diseases and Parasites: Relapsing fever

Davis, Gordon E. Ornithodoros parkeri: distribution and host data; spontaneous infection with relapsing fever spirochetes, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 54(29), July 21, 1939, pp. 1345-1349, 1 table.

Records of collection, giving locality, date, and host animal (ground squirrels, prairie dogs, rabbits, weasel, deer mouse). Specimens from 3 localities were found infected with relapsing fever spirochetes, but no transmission to man has as yet been demonstrated.

Diseases and Parasites: Selenium poisoning

Twomey, Arthur C., Sarah J. Twomey, and Loring R. Williams. Selenium and duck sickness, Science (Grand Central Terminal, New York, N. Y. 15 cents a copy), 90(2346), Dec. 15, 1939, pp. 572-573, 1 table.

Analyses of the livers of birds dying from duck sickness in Utah revealed definite traces of selenium; those for a check series from Pennsylvania did not. Selenium poisoning was also experimentally demonstrated. The symptoms are the same as those of botulinus infection. The authors are of the opinion that selenium is an important factor in western duck sickness in the areas studied.

Diseases and Parasites: Tick, Gulf Coast

Hixson, Homer. Field biology and environmental relationships of the Gulf Coast tick in southern Georgia, Journ. Economic Entomology (E. N. Cory, College Park, Md. 75 cents a copy), 33(1), Feb. 1940, pp. 179-189, 2 figs., 7 tables.

Amblyomma maculatum, not otherwise especially injurious, creates conditions favoring screw-worm infestation of the ears of domestic animals. The literature of the species, 8 titles of which are cited, is reviewed, and the life history of the tick fully discussed. Besides livestock, the known hosts include 5 species of mammals and 11 of birds. Birds are more susceptible to infestation than are the mammals. Details are given of the findings with respect to wild hosts.

Diseases and Parasites: Ticks

Jellison, William L. The burrowing owl as a host to the argasid tick, Ornithodorus parkeri, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(5), Feb. 2, 1940, pp. 206-208.

Nine of 18 burrows investigated in Washington yielded specimens of this tick previously known from a variety of small mammal hosts.

Diseases and Parasites: Trematoda, Diplostomulum

Kent, George C., Jr. A new trematode: Diplostomulum sirenis, n.sp., Journ. Washington Acad. Sci. (H. S. Rappleye, U. S. Coast and Geodetic Survey, Washington, D. C. 50 cents a copy), 30(2), Feb. 1940, pp. 87-91, 1 fig., 1 table.

From Siren lacertina, Nashville, Tenn.; description, measurements, illustration, comparative notes; bibliography of 6 titles.

Diseases and Parasites: Trematoda, Leptophyllum

Byrd, Elon E., and Robert L. Roudabush. Leptophyllum ovalis n. sp., a trematode from the brown water snake, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 471-473, 1 fig.

In Natrix taxispilota from Florida; description, illustration, comparative notes.

Diseases and Parasites: Trematoda, Maritrema et al.

Rankin, John S., Jr. Studies on the trematode family Microphallidae Travassos, 1921. III. The genus Maritrema Nicoll 1907, with description of a new species and a new genus, Maritreminoides, Amer. Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 22(2), Sept. 1939, pp. 438-451, 1 pl.

The hosts are chiefly shore birds, gulls, and ducks. The paper gives a historical review of the group and comparative descriptions of the species of the genera named, with notes on their hosts and the localities from which they are known. The new genus is based on Maritrema nettae Gower from the goldeneye and lesser scaup and includes two other species. Bibliography of 25 titles

Diseases and Parasites: Tularemia

Whitehurst, M. Morris. Tularemia (rabbit fever), Maryland Conservationist (514 Munsey Bldg., Baltimore, Md.), Winter Issue 1940 (Feb.), 17(1), pp. 20-22, 2 photos.

An introductory statement on pp. 19-20 comments on the prevalence of tularemia in Maryland, tabulates by counties the cases reported in 1937-38 (18), and 1939-39 (36), and discusses proposed legislation for control of the sale of rabbits. The main article refers briefly to history of knowledge of the disease, describes symptoms, lesions, and methods of transmittal. A high proportion of the cases are among marketmen who handle large numbers of rabbit carcasses. Sportsmen are relatively seldom affected and they may reduce the incidence of the disease by taking suggested precautions in connection with hunting and dressing rabbits.

Diseases and Parasites: Of cottontail

Clancy, C. F., E. Jungherr, and P. R. Sine. Internal parasites of cottontail rabbits in Connecticut, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 162-163, 2 charts, 1 table.

Authors' abstract: "As part of an ecologic study of the cottontail by the Connecticut Cooperative Wildlife Research Unit, an internal parasite survey of 342 cottontail rabbits showed 85% to be infested as follows: Eimeria sp. 63%, Obeliscoides cuniculi 40%, Cittotaenia variabilis 32%, Cysticercus pisiformis 28%, and Passalurus ambiguus 6%. Distribution of parasites was apparently uniform throughout the state in both hosts (eastern cottontail, Sylvilagus floridanus mallurus and New England cottontail, Sylvilagus transitionalis) except that Passalurus ambiguus was found only in the New England cottontail, primarily in eastern Connecticut. Parasitism by Obeliscoides was lowest during the winter months."

Diseases and Parasites: Of gallinaceous birds

Durfee, Thomas, and M. Wolfe Lerner. A coliform intermediate from diseased quail, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(755), Feb. 1940, pp. 245-246.

Report on an investigation of game farm material, presumably from New Jersey. Authors' summary: "Investigation of the bacterial flora in quail dying from an unknown disease has been carried out. Strains of organisms of the Proteus, Pseudomonas, Alcaligenes, Aerobacter, and Escherichia genera have been isolated and identified. A strain of Escherichia freundii has been investigated. A shifting of its biochemical reactions was observed. This organism appears to be the cause of the unknown disease of quail, Hungarian partridge, and pheasants."

Diseases and Parasites: Of gallinaceous birds

Wehr, Everett E. Nematodes of domestic fowls transmissible to wild game birds, Veterinary Medicine (7652 S. Crandon Ave., Chicago, Ill. 50 cents a copy), 35(1), Jan. 1940, pp. 52-58.

Disastrous experience has made it plain that these two types of birds should not be reared together or even in close proximity to each other. Gapeworms, crop worms, stomach worms, and intestinal worms are discussed (as to hosts, life history, control, etc.) and references to 20 titles of pertinent literature given. Apparently some of the poultry parasites reported to have been found in game birds are of different species. The situation calls for further study but enough is known to enable breeders to guard against losses from these parasites.

Ecology: Beaver

Carr, William H. Beaver and birds, Bird-Lore (1006 Fifth Ave., New York, N. Y. 30 cents a copy), 42(2), March-April 1940, pp. 141-146, 3 photos.

Ecological changes following restoration of beavers to the Palisades Interstate Park; the animals increased from 3 pairs introduced in 1920 to abou 150 individuals in 1939. Water and soil conservation and creation of habitat for many forms of wildlife are among the benefits enumerated.

Ecology: Census methods

Jackson, C. H. N. The analysis of an animal population, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 8(2), Nov. 1939, pp. 238-246, 1 fig.

Based on work with tsetse-flies in East Africa. A random sample of individuals is marked; at some later time a random sample is caught and examined; the proportion of recaptures to the total taken in the second catch ought to be the same as the proportion initially marked to the total populatio On this principle the data are elaborated, allowance being made for the factor of birth, death, and migration. Under certain conditions the absolute number of animals in a population can thus be calculated.

Ecology: Pine seed survival

Gemmer, Eugene W., T. E. Maki, and R. A. Chapman. Ecological aspects of longleaf pine regeneration in south Mississippi, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 21(1), Jan. 1940, pp. 75-86, 1 fig., 10 tables.

The paper contains references to bird and rodent destruction of pine seeds. Depredations increased during a cold spell when insect food was less available. "Field tests show that longleaf pine seed must be protected from birds and (to a lesser extent) from rodents, if a stand of seedlings is to be established. In artificial reforestation, the use of small wire tubes, mulches, and the mechanical drill seeder gave promising results." On burning, the authors concluded that "the protective value of the rough was more important than the favorable soil conditions supplied by burning or cultivating."

Ecology: Populations

Thompson, W. R. Biological control and the theories of the interactions of populations, Parasitology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 18 shillings 6 pence a copy), 31(3), Sept. 1939, pp. 299-388, 1 fig.

Historical survey of the subject covering entries in a closely-set 6-page bibliography. Discussion of the general theories of natural control, the problem of random searching, and the mathematical formulation of the inter action of populations. The author is a competent mathematician and had much t do with the building of mathematical theory of parasite-prey relationships, bu it is clear that he thinks the swing to mathematical treatment of populations has gone too far. His views are briefly summarized in the following extract:

"some workers in the field of biological control have apparently decided that the mathematical theories may be considered in some sense as a substitute for observation; that the study of them will reveal to us the facts of nature; and that we may be guided by them in practical work. Entomologists untrained in mathematics might find these conclusions rather discouraging since they would be obliged either to accept on trust principles they do not understand and cannot justify, or to undertake a lengthy course in difficult mathematics. The present writer is convinced that this view is mistaken; that the mathematical theories, though a natural and useful development, have not the significance attributed to them; that none of the theories so far produced can be considered as an adequate representation of events in nature, while the theory at present dominant, being of a form derived from physical phenomena, is particularly inapplicable to the behaviour and interaction of living organisms; and that observation and experiment are still the only safe basis for practical operations in economic biology."

Ecology: Populations, birds, England

Chapman, W. M. M. The bird population on an Oxfordshire farm, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N.W. 1, London, England. 20 shillings a copy), 8(2), Nov. 1939, pp. 286-299, 5 tables.

Discussion of 86 counts on an area of 125 acres. The bird population of hedges fluctuated less than those of arable land, and summer occupancy was more stable than that of winter. The average total population was 2 birds per acre.

Cited here mainly to reassure those who are under the impression that birds are more common in Great Britain than in the United States and that, therefore, something must be wrong with our policies or with the environment. The population figure cited is just the same as has been reached in numerous Usonian bird counts.

Ecology: Populations, vole, meadow

Blair, W. Frank. Home ranges and populations of the meadow vole in southern Michigan, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 149-161, 1 fig., 7 tables.

Author's abstract: "Home ranges and populations of the meadow vole (Microtus p. pennsylvanicus) were studied by a live-trapping method on 20.4 acres of grassland in Livingston County, Michigan. The sex ratio was about even. Peaks of breeding activity were found in spring and fall. A high rate of mortality in young voles was indicated. Adult ♀♀ had average home ranges of 0.19 ± .02 acre in moist, and 0.28 ± .03 in dry, grassland. Adult ♂♂ had average home ranges of 0.31 ± .02 acre in moist, and 0.50 ± .07 in dry, grassland. The ranges of ♂♂ were significantly larger than those of the ♀♀ in both situations. The greatest average number of voles per acre was 11.9 in early July, 1938, in moist grassland. Voles were very scarce in the summer of 1939."

Ecology: Roadside erosion

Smith, Charles C. Wildlife and roadside-erosion in central Oklahoma, Proc. Okla. Acad. Sci. (A. O. Weese, Editor, University of Oklahoma, Norman), 19, 1939, pp. 31-35, 2 tables.

Factors affecting erosion and the composition of vegetation along roadsides are discussed in their relation to wildlife. From author's summary: (1) Roadside erosion affects not only land plants and animals but also aquatic life because of the filling of lakes and streams and the clouding of the water by the soil carried to them by roadside ditches. Silt in the water interferes with the respiration of aquatic animals and diminishes the light available to them; (2) roadside vegetation serves as a source of food and cover for wildlife during a large part of the year, especially in closely farmed regions; (3) almost every species of plant found growing on the roadside serves as a source of food or provides protective and nesting cover; (4) the occurrence of excessive roadside-erosion can be attributed to methods of construction and maintenance of roads. Bibliography of 10 titles.

Economics

Slaybaugh, Nelson E. Investing the sportsman's dollar, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(1), April 1940, pp. 5-8, 1 photo, 1 graph, 6 tables.

Analysis of expenditures, and what is perhaps of more general interest estimate of returns from wildlife. Meat value of game in 1938 more than 10 million dollars and annual value of raw furs $750,000. Payment of bounties amounted to 4.83 cents on the dollar.

Education: Arbor Day and Bird Day

Authors. Arbor Day and Bird Day, Bulletin to the Schools, University of the State of New York (Albany. 10 cents a copy), 26(7), March 1940, pp. 225-264, illus.

Educational suggestions and brief popular articles. Those of most probable interest to wildlife managers are "A community bird sanctuary," by Walter Elwood (pp. 236-237, 261, 2 photos), and "Do birds get sick?" by Carlton M. Herman (pp. 246-247).

Education: Bird book for children

Van Coevering, Jack. Real boys and girls go birding (J. B. Lippincott Co., Philadelphia, Pa. $2.00 a copy), 150 pp., illus., 1939.

Stories of field experiences of children and their mentors in observing and photographing wildlife, chiefly birds. A list of recommended books, and brief directory of conservation and ornithological societies are appended. The book is fully illustrated by photographs. The author names a number of prominent wildlife students who have read the text to verify statements of fact.

Education: Birds of Tennessee

Craig, John L., et al. Birds of Tennessee in verse and story (Dept. of Conservation, Nashville, Tenn. 20 cents a copy), 76 pp., illus., n. d.

The Educational Service of the Department of Conservation prepared general chapters for this booklet on the economic value, habits, and protection of birds, and on methods of attracting them. The author cited contributes popular accounts of 30 common birds, each accompanied by eight lines of verse, a form for entering observations, a description of the bird and a frame for a colored illustration to be pasted in. These pictures, in separate enclosures accompanying the publication, were donated by the Church and Dwight Company from its well known series. They are from paintings by L. A. Fuertes.

Education: Conservation

Lumley, Ellsworth D. Shortage of waterfowl, Emergency Conservation Committee (734 Lexington Ave., New York, N. Y.) Conservation Unit 1, 3rd edition, completely revised, 26 pp., illus., 1940.

Introduction by Edward A. Preble. Discussion of danger of waterfowl extermination, history of protection, the refuge program, contributory causes of waterfowl depletion, and how the waterfowl may be saved. The leaflet, intended for use in teaching, contains suggestions on Research for Advanced Students, Class Assignments for Younger Students, and a bibliography of 30 titles.

Education: Conservation

Nagel, Werner O. Objectives for the education of youth in wildlife conservation, School and Community (Missouri State Teachers Association, Columbia, Mo. 25 cents a copy), 26(3), March 1940, pp. 108-111.

Conservation education being in the developmental stage is in need of standards. Weaknesses at present manifest include: "(1) Failure to recognize and plan according to some fundamental objectives of conservation education for youth; (2) failure to recognize two distinct youth groups [producers and consumers], and to provide instruction suited to the needs of each group; (3) lack of standards for use in planning effective activities." "The youth program should develop attitudes. x x x It should convince the youth of the value of conservation to him and to society, and of his responsibility in the matter. It should show him how to get the desired results. To be effective, the program must be of a type to provoke thought, promote discussion, and stimulate activity." The paper is a well-knit exposition of how to attain these objectives. It includes itemized standards of activities for the producer and consumer groups, and for the instructor.

Education: Conservation in 4-H clubs

Harrill, L. R. Wildlife conservation in the 4-H program, 4-H Horizons (10 Ferry St., Concord, N. H.), 2(4), Dec. 1939, pp. 3, 70, 2 photos.

Outline of activities of the clubs in North Carolina in farm environment and wildlife surveying, and study of soil conservation, forestry, and wildlife projects.

Education: Forest game management

Hosley, N. W., et al. Report of Committee on Game Management with reference to forestry, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 38(2), Feb. 1940, pp. 137-139.

Relates mainly to Civil Service examinations and makes suggestions as to correlation of these tests with teaching in wildlife management.

Food Habits

Farnham, Rouse. Game food plants, Alabama Farmer (Auburn, Ala.), 20(6), March 1940, pp. 16, 22.

Discussion by plant groups of important sources of food for the bobwhite and mourning dove, with briefer mention of the diet of the wild turkey, cottontail, and gray squirrel.

Food Habits: Pheasant damage

Langenbach, John R. Crop damage by ringneck pheasants, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(12), March 1940, pp. 10-11, 2 photos, 2 tables.

Reports of damage to corn and tomatoes seemed numerous enough to demand investigation. This article relates to inquiry into tomato depredations in 1939. It was found that losses due to rot, sun scald, insects, and culling in a total of 10 categories were all in excess of those caused by pheasants. The findings are tabulated to show the percentage of green, red, and all fruits damaged, the average losses per ton and their financial significance.

Food Habits: Utilization of fungi

Diehl, William W. Endogone as animal food, Science (Lancaster, Pa. 15 cents a copy), 90(2341), Nov. 10, 1939, p. 442.

Notes on the finding of the small truffle-like fructifications of this fungus in the stomachs of 3 species each of shrews and mice.

Food Habits: Of bobcat

Stebler, A. M. 'Cats have their cycles, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(6), March 1940, p. 11.

Data on bounty payments indicate considerable variation in the bobcat population from year to year, whether due to cycles or to control pressure is uncertain. Analyses of material thus far collected for food habits studies showed small mammals to be of most frequent occurrence, with hares and rabbits second, deer (mostly carrion) third, and birds (probably also largely carrion) fourth.

Food Habits: Of bob-white

Warner, S. R. Some quail food plants of southeastern Texas, Agricultural and Mechanical College of Texas (College Station) Agr. Expt. Station Progress Report 382A, 9 pp., 1 map, 2 tables, mimeographed, Jan. 1940.

Summary of valuable seasonal foods, and table (occupying 6 pages) giving a classified list of quail food plants with notes on their value, time of seeding and fruiting, occurrence on grazed or ungrazed areas, and on various soils.

Food Habits: Of chipmunk, Tahoe

Baysinger, Verlin G. Chipmunk feeding on white fir aphids, Yosemite Nature Notes (Yosemite National Park, Calif.), 19(3), March 1940, pp. 19-20, 1 fig.

Field observation; the insect, Cinara occidentalis.

Food Habits: Of deer, white-tailed

Pearson, Allen M., and Carey S. Burnett. Deer food in the Black Warrior National Forest, Alabama Game and Fish News (Alabama Dept. of Conservation, Montgomery), 11(8), Feb. 1940, pp. 3-4, 1 table.

Report on analyses of the contents of 19 stomachs collected in December. The principal items are tabulated as to volume and frequency of occurrence and all foods identified are mentioned in the text. Acorns and oak browse comprised about half of the total bulk of food; other important elements were fruits and browse of greenbriers and sumacs. Selective timber cutting to keep the canopy somewhat open is recommended to encourage the growth of valuable food plants.

Food Habits: Of gallinaceous birds

Kelso, Leon. Plant foods of upland game birds, Oologist (R. M. Barnes, Lacon, Ill.), 56(11), Nov. 1939, pp. 122-132; 56(12), Dec. 1939, pp. 140-144.

Discussion by families of the more important foods based on the writer's studies while he was a member of the Biological Survey. Author's summary: "(1) The Grouse are more generalized in their vegetable diet, consuming more stems, buds, leaves, fruit and nuts than the Quails. The Quails eat more seeds than do Grouse; (2) in general the Rosaceae are the most important plant family in the food of the Grouse; (3) the Leguminosae are the most important plant family in the diet of Quail and Partridges; (4) the availability of soft fruits is evidently an important factor in the health and survival of juvenal Quail and Grouse."

Food Habits: Of grouse

Anon. Grouse crop investigation, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 5(3), March 1940, pp. 23-24.

Preliminary reports on analyses of 10 crops of greater prairie chickens (1), 40 of sharp-tailed grouse (2), and 259 of ruffed grouse (3). Leading food items were, respectively, for: (1) corn, birch catkins, dandelion leaves, groundcherries, and wintergreen berries; (2) grasshoppers and clover leaves; and (3) clover leaves, birch catkins, birch buds, dandelion leaves, and grasshoppers.

Food Habits: Of kite, white-tailed

Hawbecker, Albert C. The nesting of the white-tailed kite in southern Santa Cruz County, California, The Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(2), March-April 1940, pp. 106-111, figs. 29-30.

Observations made at 4 nests. Compact pellets were cast of which about 180 were examined. Meadow mice were the overwhelmingly predominant food item. Four other rodents and one rabbit also were identified. Irregularities in kite nesting may be explained by variations in the availability of meadow mice.

Food Habits: Of lizards

McCauley, Robert H., Jr. Notes on the food habits of certain Maryland lizards, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 22(1), July 1939, pp. 150-153.

Based on examination of the alimentary content of representatives of 9 species.

Food Habits: Of merganser, American

Lagler, Karl F. Submarine fisherman, Hunting and Fishing (350 E. 22nd St., Chicago, Ill. 5 cents a copy), 17(4), April 1940 (March), pp. 13, 20-21, illus.

Popular article based on the findings of the investigation abstracted under Salyer and Lagler (below). The merganser feeds largely on trout, taking many of legal size, but damage can be controlled by driving the birds from trout streams to waters where there is little opportunity for them to do damage.

Food Habits: Of merganser, American

Salyer, J. Clark, II, and Karl F. Lagler. The food and habits of the American merganser during winter in Michigan, considered in relation to fish management, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 186-219, 2 pls., 2 charts, 17 tables.

Authors' abstract: "Areas of maximum autumn and spring concentrations for the American merganser (Mergus merganser americanus) in Michigan are the waters margining the northern half of the Lower Peninsula. During unusually cold or prolonged winters when these waters freeze over, large numbers of mergansers are forced onto inland waters, frequently trout streams. The food of 345 specimens from all types of fishing waters showed that the species at times on trout streams constitutes a serious menace to the sport fishery whereas on other natural waters it is either innocuous or beneficial. 'Merganser drives' are described as a means for controlling concentrations on trout streams. Mechanical devices which exclude or frighten mergansers are adequate for protecting fishes in rearing ponds. Feeding is largely diurnal and by sight; one-third to one-half of the body weight is estimated as the average daily food consumption of wintering birds. Because of their food and habits, the red-breasted (Mergus serrator), and hooded (Lophodytes cucullatus), mergansers are considered to be of no importance to fish management in Michigan."

Food Habits: Of muskrat

Butler, L. A quantitative study of muskrat food, Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 25 cents a copy), 54(3), March 1940, pp. 37-40, 3 tables.

Food plants of a marsh near Mafeking, Manitoba, are listed in the order of their importance, and their percentage consumption during the summer months tabulated. Bulrush, cattail, sweetflag, and sedge lead. From feeding experiments, the amount each of 7 species of plants consumed per day was calculated. Counts of the stands of the herbs in the marsh were used in estimating their carrying capacity per acre. Amounts eaten varied from 20 to 128 stems or plants and carrying capacity from 3 to 26 muskrats per acre.

Food Habits: Of opossum

Allen, Durward L. Nobody loves the 'possum, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(6), March 1940, pp. 5, 10, 2 photos.

The possum is prolific, adaptable, and omnivorous. It preys to some extent upon eggs, including those of pheasants and wild ducks, raids poultry at times, but feeds more upon carrion, and takes also fruits and grain, seeds and grass, insects and worms--almost anything edible. In Michigan the species seems to be nearing the northern limit of occupiable range, as the animals lose the tips of their ears and tails by freezing.

Food Habits: Of owl, barn

Davis, Wm. B. Mammals compose more than 92 percent of food of the barn owl in Texas, Texas Game, Fish, and Oyster Commission (Austin) Monthly Bulletin, 3(2), Jan. 1940, p. 6, 1 fig.

List of animals identified from a collection of pellets that yielded 542 food items. Percentage representation by groups was: mammals, 92.3; non-game birds, 4.1; game birds, 1.1; and insects, 2.5.

Food Habits: Of owl, great horned

Fitch, Henry S. Some observations on horned owl nests, The Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(1), Jan.-Feb. 1940, pp. 75-75.

Attempted counts of the population gave results around 6.6 birds per square mile. Nesting sites and nests are described and their occupancy briefly recorded. The prey brought to 5 nests is listed; it consisted chiefly of rabbits and large rodents: wood rats, kangaroo rats, pocket gophers, and ground squirrels. No birds were included.

Food Habits: Of pheasant

Munro, J. A., and Stanley Saugstad. The ring-necked pheasant. Fall and winter feeding habits in southeastern North Dakota, North Dakota Agr. Expt. Sta. (Fargo) Bimonthly Bul., 2(4), March 1940, pp. 7-8, 3 tables.

Tabulation of the frequency of occurrence of food items in an undisclosed number of crops and gizzards collected in the fall of 1936, winter of 1937, and fall of 1938, and also of percentages by weight of the principal foods taken in 1938. "The pheasant subsists largely upon waste grains, corn and wheat principally, weed seeds, wild fruits, and insects." Table 3 shows the maximum number of each of several kinds of foods taken by individual birds; largest item: 11,540 seeds of pigeon grass.

Food Habits: Of quail, California

Glading, B., H. H. Biswell, and C. F. Smith. Studies on the food of the California quail in 1937, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 128-144, 2 pls., 2 figs., 3 tables.

Authors' abstract: "A bio-ecological study was made of the food habits of the California quail (Lophortyx californica) in relation to food materials available to them in the calendar year 1937, at the San Joaquin Experimental Range in Madera County, California. A wide discrepancy was found between the relative amounts of certain items present in the plant cover and the proportions in which they were taken by the quail. Some species, though sparse in the plant cover, e.g. Trifolium spp. and Lupinus bicolor, made up a large percentage of the quail diet, whereas, other common species, e.g. Bromus spp., contributed only small percentages of the quail food. Other species, e.g. Erodium spp., were common both in the quail diet and the plant cover. An expression developed to show 'desirability' for various food items is as follows:

$$\text{Desirability Coefficient} = \frac{\text{Per cent of Diet X Per cent of Frequency.}}{\text{Per cent of Forage Composition}}$$

Leaves form the bulk of the diet during the rainy winter season and seeds during the dry summer. The birds did not make use of summer greens such as Hemizonia virgata leaves, but relied on open watering places as sources of moisture. Food shortage is not considered to be a management problem on this area in years of normal rainfall. Animal food, largely insects, made up less than .5% of the annual diet and were taken mostly by laying females."

Food Habits: Of rabbit, European

Southern, H. N. Coprophagy in the wild rabbit, Nature (St. Martin's St., London, W.C. 2, England. 1 shilling a copy), 145(3668), Feb. 17, 1940, p. 262.

Supplementing the paper by Madsen (abstracted in WILDLIFE REVIEW, No. 24, Nov. 1939, p. 21), the author reports several observations on coprophagy.

Food Habits: Of turtles

Lagler, Karl F. A turtle loss?, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 29(1), Jan.-Feb. 1940, pp. 41-44, 2 photos, 1 diagram.

Summary of investigation of food habits of 6 species of turtles in Michigan. Most space is devoted to snapping turtles, 186 stomachs of which were examined. The food contained in these "was made up as follows: one-third water plants, the second third, game fishes, and the last third, dead fishes, and other carrion, insects, crayfishes, snails, and clams." The probable loss of game fishes to snappers is estimated at 1 fish per acre daily. This is not enough in itself to determine the quality of the fishing. In some waters, "reduction of the numbers of sub-legal fishes by this turtle and other fish predators is beneficial to the angler" in concentrating the rather fixed quantity of fish the water can produce into a smaller number of large fishes. Turtles compete for food with fishes but do much useful scavenging. The problem varies with the water and should be investigated before action is taken. At hatcheries, summary removal is warranted; a trap is illustrated and its use described.

Food Habits: Of weasel, mountain

Baysinger, Verlin G. Mountain weasel catches golden-mantled ground squirrel, Yosemite Nature Notes (Yosemite National Park, Calif.), 19(3), March 1940, pp. 22-23.

Food Habits: Of weasel

Lippincott, Joseph W. I trap no more weasels, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(12), March 1940, pp. 6, 25, 4 photos.

Observations convinced the writer that weasels prey far more on mice, rats, and ground and red squirrels than upon larger game and he recommends their protection.

Life Histories: Dove, White-winged

Neff, Johnson A. Range, population, and game status of the western white-winged dove in Arizona, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 117-127.

Author's abstract: "The western white-winged dove (Melopelia asiatica mearnsi) is an important game species in Arizona. To obtain information needed for its management, studies of the life history of the species were begun in 1938; this article combines observations of the 1938 and 1939 seasons. Many of the foods taken by white-wings are listed; fruits of the giant cactus (Carnegiea gigantea) are the most favored. The known range of the species is extended somewhat to the northward, and to an elevation of 6,400 feet. Dates of arrival in spring and of departure in autumn are presented. Distribution and density of summer populations are discussed and their relation to food and water is shown. The flocking habits of the species make it especially susceptible to concentrated heavy shooting and frequently whole flights are decimated. Age analysis of 1,684 birds in hunters' bags showed 33-1/3% adult and 66-2/3% juvenile doves. Heavy shooting is more influential in causing early migration to Mexico than are violent storms. The general population trend has been consistently downward and vigorous protective measures are recommended."

Life Histories: Elk

Young, Vernon A., and W. Leslie Robinette. A study of the range habits of elk on the Selway Game Preserve, University of Idaho (Moscow) Bul., 34(16), 48 pp., 3 figs., 5 tables, Dec. 1939.

Review of pertinent literature of which 6 titles are cited. The methods of the investigation, and topography, climate, and biotic history of the study area are described. Elk characteristics and habits are detailed with special attention to calf development, feeding, and habits. The number of calves is equal to about 80 percent of that of the cows. Forage and palatability studies were featured and the results are presented in tabular form. Key species for the summer range are: Salix spp., Acer glabrum, Bromus carinatus, Elymus glaucus, and Carex geyeri. The last-named because of its great abundance and high palatability is the most important herbaceous forage species. Besides the plants named, Amelanchier alnifolia, Sorbus scopulina, Prunus emarginata, and Penstemon pinetorum also are especially valuable. Palatability varies considerably with the season. Salt requirements were highest from early July to early August; artificial salting is recommended. Coyotes are the only important predators (on calves). Insect pests and ticks are briefly mentioned.

Life Histories: Hyla ocularis

Harper, Francis. Distribution, taxonomy, nomenclature, and habits of the little tree-frog (Hyla ocularis), American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 22(1), July 1939, pp. 134-149, 5 figs.

Distribution, synonymy, history, habitat, structure and locomotion, voice, measurements. Bibliography of 19 titles. "Tiniest of North American frogs."

Life Histories: Leucosticte

Twining, Howard. Foraging behavior and survival in the Sierra Nevada rosy finch, The Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(1), Jan.-Feb. 1940, pp. 64-72, figs. 19-22.

Leucosticte tephrocotis dawsoni; habitat and habits in the northern part of Yosemite National Park; chief enemy, the chipmunk (Eutamias alpinus).

Life Histories: Moose

Bailey, Vernon. Our North American moose, Nature Magazine (1214 Sixteenth St., N. W., Washington, D. C. 35 cents a copy), 33(5), May 1940, pp. 269-272, 3 photos, 1 map.

Popular account of these animals and their habits and life history. Brief description and measurements and a map of distribution of 3 subspecies.

Life Histories: Muskrat

Errington, Paul L. Natural restocking of muskrat-vacant habitats, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 173-185.

Author's abstract: "Spring dispersal of breeding muskrats (Ondatra zibethica) from locally favorable and protected wintering habitats results in a variable degree of repopulation of neighboring areas on which survival is low because of natural emergencies or excessive trapping. This movement, which seems due chiefly to accentuated territorial intolerances, occurs in central and northwestern Iowa from about the middle of March to the first of June, and the distribution of the animals tends to become equalized in attractive environment for some miles away from the areas where they wintered; formerly used muskrat lodges and burrows are often taken over by new-comers, but selection of breeding territories in areas that have not been recently occupied by the species may be rather haphazard except as concerns spatial relationships. The numbers of young actually raised per breeding pair by late fall and early winter ranged from four to 17, with moderate breeding densities being most productive; there is no evidence from the present studies that Iowa muskrats breed in the calendar year of their birth, and movements of animals after the breeding season do not generally appear to be of much consequence in repopulating vacant habitats. Recommendation for the management of the muskrat fur crop on a sustained yield basis is establishment of a system of suitable and well-spaced wintering refuges to insure a spring overflow of muskrats into breeding grounds that are likely to be overtrapped in fall and winter."

Life Histories: Wolverine

Beebe, William. Wolverines and men, Bulletin N. Y. Zoological Soc. (185th St. & Southern Blvd., New York, N. Y. 35 cents a copy), 43(2), March-April 1940, pp. 54-59, 2 figs.

Popular, mostly compiled, account of fable and fact relating to this species. Food items mentioned include: berries, grasshoppers, frogs, mice, squirrels, foxes, hares, beavers, caribous, moose, and deer. The animal has been reported also to kill a puma and a bear.

Life Histories: Woodcock

Merovka, Lawrence J. The woodcock in Louisiana, Louisiana Conservation Review (Dept. of Conservation, Court Bldg., New Orleans, La.), Winter Issue, 1939-40, pp. 10-14, 4 photos.

Wintering areas, habitats, and habits. Only one recent nesting record is regarded as authentic. Description of fire-lighting, now almost entirely suppressed. Headlights have facilitated capture of birds for banding, interesting returns from which are cited. They indicate that the Louisiana wintering birds are summer residents of the northeastern parts of the bird's range (where the species is still most plentiful). Twenty-two birds were found feeding at night in a six-acre field in Louisiana.

Life Histories: Woodcock

Studholme, Alan T., John D. Poule, and Russell T. Norris. A study of Pennsylvania woodcocks, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(11), Feb. 1940, pp. 6-7, 23, 30, 5 figs.

Compiled and original notes relating to various phases of the life history; the authors' observations were made on the oak barrens of Centre County. This region and the bird's courtship activities there are described. The characteristics of singing grounds are given as well as measurements of these areas and their distances apart. A number of the birds were trapped and banded by methods that are described and illustrated.

Management: Attracting birds

McAtee, W. L. Attracting birds, U. S. Dept. of the Interior, Conservation Bul. 1 (Supt. of Documents, Washington, D. C. 5 cents a copy), 15 pp., 12 figs., 1940 (April).

The advantages and disadvantages of attracting birds are discussed, with the conclusion that the practice is advisable in the hands of those who undertake it seriously and take all desirable precautions. Methods are treated under the heads of protecting, landscaping, encouraging nesting, supplying water, feeding, and cultivating food supplies.

Management: Beaver

Carhart, Arthur H. Colorado garners her beaver, American Forests (919 Seventeenth St., N. W., Washington, D. C. 35 cents a copy), 46(2), Feb. 1940, pp. 69-71, 89, 96, 3 photos.

Under protection, beavers once nearly exterminated have increased to an estimated 85,000. Research and management are proceeding simultaneously and animals are being transplanted from areas where they prove troublesome to mountain streams where their dam-building will be of benefit in silt and flood control and water and fish conservation. Fruit crops have been saved by releasing water impounded by beavers into irrigation systems. A water commissioner on the Cimarron River states that his district gets twice as much water as it did before the beavers built numerous ponds in the headwaters of that stream. Plans for harvesting pelts are mentioned and the illicit traffic in beaver skins and efforts to end it are described.

Management: Big game, national forests

Shantz, H. L. A fair policy on big game, National Wool Grower (509 McCormick Bldg., Salt Lake City, Utah), 30(3), March 1940, pp. 13-16, 1 photo (portrait of author).

Big game on national forests has increased from about 200-300 thousand head in 1908 to some 1,840,000 at present, more than doubling every ten years. Certain concentrations present major problems in management, and despite reduction in domestic livestock, it is certain that the game herds must be cut down. Several suggestions for reduction are discussed, of which killing of all age classes and sexes probably would be most desirable and effective, but which encounters much emotional resistance from the public. Herd regulation has been accomplished in some instances, however, the most successful perhaps being that of elk in Utah. "The Forest Service believes that big game is an important resource, to be used and enjoyed, that to be of use it must be harvested as is any other crop and in such a way as to keep it in balance with other uses." Management is a necessity and its objectives are: "(1) To provide and maintain a suitable year-long environment. This in the case of some of the big game species will require cooperation with private land owners, and with state and federal agencies to insure as far as may be practicable suitable winter grazing lands; (2) to restore and maintain appropriate populations. This implies restocking and protection in many areas and increased hunter take in others; (3) to integrate wildlife management with other forms of land use management; (4) to correlate wildlife with social and economic needs, especially those of local communities; (5) to cooperate with state, federal, and other interested agencies to obtain utilization on a sustained yield basis." Deer should be favored, as a rule over elk as being more productive. In the experience of the Forest Service, permanent game refuges have not proved desirable; some should be eliminated and others reduced in size. Management should be in full cooperation with local agencies.

Management: Big game, Ohio

Chapman, Floyd B. A big game policy for Ohio, Ohio Division of Conservation and Natural Resources (Columbus), Bul. 160, 4 pp., mimeographed, 1940.

The increase and spread of deer in Ohio, accompanied by some agricultura damage, demands adoption of a definite policy for management of the animals. Black bears still linger in the State and do some damage. Suggestions are give for the protection, management, and utilization of both species.

Management: Bob-white

Lehmann, Valgene W. Habitat improvements for quail, Texas Game, Fish, and Oyster Commission (Austin), Bul. 17, 11 pp., 7 photos, 1 table, Oct. 1939.

The secret of increasing the number of bob-whites is multiplying adequat covey ranges. These require especially headquarters cover (less in amount thar is commonly suspected) and food. Suggestions are given for the construction of brush and pole-shelters, for fencing cover plants and food patches (so necessary in a cattle country), and for planting the feed plots. The common deficiencies in cover and suggested remedies are treated in the table. Results from the adoption of methods recommended in the bulletin have been highly favorable. Examples are given.

Management: Bob-white

Montgomery, George A. Texas brings back quail, Capper's Farmer (Topeka, Kansas. 5 cents a copy), 50(11), Nov. 1939, pp. 13, 22, 1 photo.

Results of game management extension by the Texas Agricultural and Mechanical College. In 14 months from inception of the work, demonstration areas embracing 20,000,000 acres had been organized in 172 counties. Demands for aid in the work were more than the available staff could fulfill. Improved public sentiment was considered better than increased warden service and encouragement of natural propagation better than restocking. Examples are given of the practices adopted by farmers and their results. Harvest is regulated, one county permitting a kill of only 33 percent.

Management: Cover

Ford, A. L. Shelterbelting by the Forest Service--A truly conservative program, South Dakota Conservation Digest (South Dakota Game and Fish Dept., Pierre), 7(3), March 1940, pp. 2-3, 15, 4 photos (one a portrait of author)

To date 1,645 miles of standard basic tree belts (from 10-21 rows requiring 23,000,000 trees) have been planted in eastern South Dakota on some 3,000 farms. Survival has averaged around 80 percent. The relation of the shelterbelts to various phases of conservation is discussed. They have elicited great response from small birds and are proving their value as cover for the ring-necked pheasant and Hungarian partridge.

Management: Farm wildlife

Edminster, F. C. Soil Conservation Districts (Soil Conservation Service, Upper Darby, Pa.), 2599a, 11 pp., mimeographed [April 1940].

It is estimated that four-fifths of all the game shot by hunters in the United States comes from privately-owned farms. The number of hunters has vastly increased in the last 20 years and the means of transportation have been so improved that practically all areas are visited. Difficulties in farmer-sportsman relationships have increased and they cannot be said to have been generally and practicably solved by any of the numerous plans that have been tried, locally meritorious though a few of these appear to be. The author contends that to achieve success: "(1) The cooperative must tie in with a functioning farmer organization, and (2) it must function at a low cost per acre for administrative expenses" and he suggests that the Soil Conservation Districts provide suitable operating units. "The Districts are organized and operated by the farmers themselves and district policies are established by them." They are, however, the beneficiaries of cooperation by various public agencies. The organization of a district is described, and suggestions are made as to wildlife management procedures that may be written into cooperative agreements. The Districts afford an opportunity for all conservation interests to work together. Thirty-six States have enacted the requisite basic legislation and there are now more than 125 million acres included in organized districts.

Management: Farmer-sportsman relationship

Cramer, Wilbur M. The hunters of tomorrow and their happy hunting ground, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(12), March 1940, pp. 4-5, 29, 2 photos, 2 reproductions of posters.

Hunters should try to appreciate the aims and problems of farmers and cultivate good will and understanding. Fox hunters have had outstanding success in this respect and small game hunters should emulate their example. The farmer desires acknowledgment of his property rights and assured safety for his family, and for his livestock and other property. These wants are fair and reasonable and hunters must accept them as the basis of negotiations for hunting privileges. Good hunters must cooperate not only by considerate and legal behavior but also by aiding in the elimination of opposed tendencies. Fairness, courtesy, and cooperation are necessary to improvement in farmer-sportsman relationships.

Management: Food patches

Morton, James N. The Pennsylvania game food plot mixture, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(12), March 1940, pp. 3, 27, 2 photos.

Experimental plantings in 1937 and practical tests in 1938, resulted in selection of a mixture most suitable for State conditions. Directions for

planting are given. The approved mixture is:

Broom Corn (Dwarf Japanese)	20	pounds
Sorghum (Early Amber)	20	"
Sudan Grass	5	"
Buckwheat (Japanese)	8	"
Sunflower (Small Branching type)	10	"
German Millet	10	"
Japanese Millet	10	"
Broom Corn Millet (or Hog Millet)	5	"
Kaffir Corn (Early Kaffir Corn Variety)	10	"
Rape (Dwarf Essex)	2	"

Management: Fencing

Kelley, M. A. R. Farm fences, U. S. Dept. Agriculture Farmers' Bul. 1832 (Supt. of Documents, Washington, D. C. 10 cents a copy), 57 pp., 64 figs., 10 tables, Jan. (April) 1940.

Without direct relation to wildlife, this bulletin, nevertheless, will be of value to managers who have to deal with fencing. It treats kinds of fences (including electric), fence posts, methods and costs of fencing, gates, lightning protection, and maintenance of fences.

Management: Forest wildlife

Montgomery, W. E. Forest management and wildlife, Forest Leaves (Wayne, Pa.), 29(1), Oct. 1939, pp. 9-10, 21-22.

Essentially the same material as in the author's article on forest management abstracted in WILDLIFE REVIEW, No. 24, November 1939, p. 32.

Management: Forest wildlife

Morton, James N. The development of forest areas for wildlife, Forest Leaves (Wayne, Pa.), 29(4), Oct. 1939, pp. 11-12, 1 map.

Diversity of interests in forests that foresters must take into account. One of the strongest of these interests is in wildlife and it must be recognized in connection with forest management. Cutting operations to open up closed canopy woodlands yield various readily salable forest products. Such improvement cuttings have been done on a considerable scale in Pennsylvania. Thinning and releasing also have been extensively practiced; they are of value to the forest as well as to wildlife. Some planting of food patches has been done and large numbers of food and cover yielding woody plants have been set o

Management: Gallinaceous birds

Lowe, Wm. J. Upland game birds in North Dakota, North Dakota Outdoors (State Game and Fish Dept., Bismarck, N. Dak.), 2(10), April 1940, pp. 3, 6.

Brief popular account of the native and introduced gallinaceous birds noting their present status and the environments to which they are best suited. The importance of corn to pheasants is emphasized. A plea is made for farmer-sportsman cooperation in improving food and cover.

Management: Harvesting

Baumgartner, Luther L. A survey of the 1939 squirrel harvest in Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 128, 11 pp., 9 tables, mimeographed, March 1940.

Last of 3 reports on this subject, the preceding installments having appeared in 1937 and 1939. Some 1,600 hunters were interviewed. Age classes of the squirrels, adult and juvenile, were about equally represented in the bag. The animals were mostly in good condition; 7, however, had mange. The average seasonal bag was 6.29 squirrels, a drop in hunting success from 1938 attributed to a shortage of squirrels due to a mast crop failure. Sex ratio of those shot varied by locality but for the total kill was about 52:48. Crippling losses were about 10 for every 100 fox squirrels, and 18 for every 100 gray squirrels, bagged. Shot-guns caused more crippling than rifles. The tables summarize details of the inquiry with respect to the points mentioned as well as to portion of the open season utilized by hunters, comparative kills of gray and fox squirrels in each of 6 districts, hunter success in the same areas, hunters' opinions as to abundance of squirrels compared to that of the 1938 season, etc. Bibliography of 9 titles.

Management: Introduction

Hicks, Lawrence E. The role of exotics in the Ohio Valley and the lower Great Lakes Region, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 133, 4 pp., mimeographed, March 1940.

In environment extensively altered by man, exotic species may prove superior to the native; at any rate they should be judged on performance rather than by prejudice. The author notes the preponderance of introduced species in agriculture, the success of which is in fact due largely to the utilization of the most adaptable plants and animals from all parts of the earth. Game crops, also, of whatever origin must be utilized. Unfilled ecologic niches may possibly be stocked with exotics, suggestions for the choice of which are given. Those which cannot find a vacant habitat are not likely to become established. In highly cultivated areas, the opportunity for exotics is likely to be greatest. Hunting pressure also is most severe there and it can be met best in the long run by use of the already adapted exotic species.

Management: Inventory

Anon. Annual wildlife statistics, 1939, U. S. Forest Service, Region 1 (Missoula, Mont.), 22 pp., mimeographed.

Estimates for the National Forests in Region 1 (Montana 12, Idaho 7, Washington 1) of big game animals and the numbers killed by men and by predatory animals, the numbers of predatory animals and of those killed on the forests and adjacent lands, the populations of fur animals, report on law enforcement, relative populations of game birds, statistics on State and Federal game areas and their utilization for grazing and report on game salting and upon fish planting.

Management: Inventory

Anon. Wildlife report, Region Six, 1939, U. S. Forest Service, Region Six (Portland, Oreg.), 21 pp., 10 tables, mimeographed, March 1940.

The tables present data that are also discussed in the text on the big game census, estimates of the numbers of fur animals, predators, game birds, game animals killed by hunters and by predatory animals, estimated number of hunters, trappers, and fishermen on the forests, statement of game law enforcement, list of wildlife improvements and record of fish distribution and beaver transplanting.

Management: Inventory

McLean, Donald D. Counting our game, California Conservationist (State Dept. of Natural Resources, Sacramento, Calif. 10 cents a copy), 5(1), Jan. 1940, pp. 18, 23.

Semi-popular account relating to deer, bighorn, quail, and waterfowl. Figures are given on the number per square mile of 6 kinds of deer.

Management: Planting, seed cleaning

Steavenson, Hugh A. The hammer mill as an important nursery implement, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 38(4), April 1940, pp. 356-361, 3 photos, 2 tables.

Utility of the mill in cleaning pulp surrounded seeds and in threshing dry-fruits. The tables record the efficiency of the machine with various types of seeds, and the costs of cleaning. With change of part of the apparatus, it may be used also as a scarifier. Bibliography of 6 titles.

Management: Planting for wildlife

[Massey, A. B.] Woodland borders can be both beautiful and productive, Virginia Wildlife (Blacksburg, Va.), 3(8), April 1940, p. 6.

Border vegetation is useful in preventing erosion, and excessive drying of the forest floor as well as in furnishing cover and food for wildlife. List of nearly 30 groups of plants suitable for planting along the woodland margin with notes on their soil requirements.

Management: Planting for wildlife and erosion control

Davison, Verne E. Protecting field borders, U. S. Dept. of Agriculture Leaflet 188 (Supt. of Documents, Washington, D. C. 5 cents a copy), 8 pp., illus., Dec. 1939 (1940).

Treatment of field borders that answers agricultural requirements and also provides much food, cover, and nesting protection for wildlife. Lespedeza sericea is chiefly recommended for planting; preparation, maintenance, and utility of field borders are discussed.

Management: Planting for wildlife and erosion control

Hopkins, Ralph C. The farmer and wildlife, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 5(3), March 1940, pp. 67-70.

Essentially a statement of practices by Wisconsin farmers that are reimbursable under the Federal agricultural adjustment program.

Management: Planting for wildlife and erosion control

Hughes, C. E. New homes for wildlife, Farmers' Guide (Huntington, Ind.), 96(4), Feb. 24, 1940, p. 87, 1 photo.

Mainly an account of farmer cooperation with the Soil Conservation Service near Peoria, Illinois; work not advanced enough for results to be known. Brief discussion of farmer-sportsman relationship.

Management: Sandhill area in North Carolina

Leffelman, L. J. Nature again has her way on the Poinsett project, Soil Conservation (Supt. of Documents, Washington, D. C. 10 cents a copy), 5(8), Feb. 1940, pp. 207-209, 2 photos.

A sandhill region in Sumter County, North Carolina, devastated by lumbering, war, and parasitic agriculture. Game once abundant and widespread was decimated and forced into bottomland swamps. Reforestation and improved land management produced a six-fold increase in quail and brought back the wood duck, once almost extirpated. Hunting and fishing are prohibited but will be permitted again when a surplus of fish and game has been developed.

Management: Seed collecting and handling

Mirov, N. T., and Charles J. Kraebel. Collecting and handling seeds of wild plants, Civilian Conservation Corps Forestry Publication No. 5 (Supt. of Documents, Washington, D. C. 10 cents a copy), 42 pp., tables, illus., May 1939.

Suggestions as to collecting and preserving material, extracting and cleaning seeds when necessary, storing and germinating them (both with and without special treatment), propagating wild plants by vegetative means, and establishing a wild-plant nursery. Tables list some wild plants that can be propagated vegetatively, and give seed and cultural data for numerous western species. Two special bibliographies cite books on wild plants for western States and publications useful in connection with the propagation of plants.

Management: Soil conservation in relation to wildlife management

Bennett, Hugh H. Soil Conservation (McGraw-Hill Book Co., Inc., New York, N. Y. $6.00 a copy), xviii+993 pp., 1939.

A full exposition of this branch of conservation by its leader. A chapter on "Wildlife and soil conservation" (pp. 568-595, figs. 236-251), presumably by other hands, emphasizes the joint dependence of soil and wildlife conservation upon vegetative cover. Types of cover and their utility are discussed. The original abundance of wildlife is referred to and the effect upon it of human occupation of the land, especially that characterized by clean farming, are pointed out. Depletion has made the residue of wildlife more valuable and its conservation is an important objective for economic, biologic and esthetic reasons. As wildlife management and soil conservation employ the same tools, it follows that with appropriate direction, the objectives of both may be attained through the same operations. These may be applied to farming and water and soil conservation in ways that are described and through the use of materials that are suggested.

Management: Stocking, beaver

Fox, Adrian C. Beavers as water conservationists, North Dakota Outdoors (State Game and Fish Dept., Bismarck, N. Dak. 5 cents a copy), 2(9), March 1940, pp. 5-6, 4 photos.

Notes on the increase (6 to 40) and spread (4-6 miles) of some small plantings and their impoundment of water. Compared to man-made structures, beaver dams are very cheap. They are of value for stock-watering, sub-irrigation, and water conservation.

Management: Water supply

Johnson, Carlock E. Waterholes for wildlife, National Park Service Region III (Santa Fe, N. Mex.), 2(2), April 1940, pp. 9-11 (mimeographed).

Water requirements of deer in the Southwest; in some areas development of watering facilities might double the wildlife. Suggestions as to improvement of springs and seeps. The article also lists a number of the most valuable wildlife food plants of the Southwest.

Natural History: Birds of Montana

Weydemeyer, Winton, K. D. Swan, and E. F. Rapraeger. List of the birds of western Montana, U. S. Forest Service, Northern Rocky Mountain Region (Missoula, Mont.), Field Notes on Wildlife, 16 pp. (mimeographed), 1940.

Very briefly annotated list of 241 species and subspecies observed by the authors with supplement of 14 forms reported by others in 6 publications that are cited in a terminal bibliography.

Natural History: Distribution

Kroeber, A. L. Cultural and natural areas of native North America, Univ. of California Publications in American Archaeology and Ethnology (University of California Press, Berkeley) 38, xii+242 pp., 28 maps, 1939.

Of interest to biologists especially for its discussion of vegetational areas (a compilation from 10 leading sources with concordance) and of physiographic areas, the former illustrated by 4, and the latter by 1, folding maps. These summarized, as well as separate climatic and other distributional factors are applied to an analysis of cultural types of American aborigines.

Natural History: Herpetology of Florida

Carr, Archie F., Jr. A contribution to the herpetology of Florida, Univ. of Florida (Gainesville) Biol. Science Series, 3(1), Jan. 1940, 118 pp.

History of the study of herpetology in Florida; discussion of derivation of the fauna and of its habitat distribution; key to the forms treated; and annotated list of 162 species and subspecies of reptiles and amphibians. Bibliography of 5-1/2 pages and full index. A substantial and valuable publication.

Natural History: Mammals of Iowa

Hicks, Ellis A., and George O. Hendrickson. Fur-bearers and game mammals of Iowa, Iowa Agr. Expt. Sta. Bul. P3 (N.S.), pp. 115-145, 2 pls., 10 figs., Feb. 1940.

Brief popular account of 16 species with illustrations by Sid Horn (including cover design) of 11 of them. The 2 plates diagram the tracks of 8 species. Most is said about food habits and fur and other economic values. There are sections on the care and handling of furs and on traps and trapping, together with a glossary of terms used in the fur trade.

Natural History: Mammals of Oklahoma

Blair, W. Frank. Faunal relationships and geographic distribution of mammals in Oklahoma, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 22(1), July 1939, pp. 85-133, 1 map, 2 tables.

History of the study of mammals in the State, discussion of biotic districts (with lists of their species) and of factors affecting mammalian distribution. Annotated list of 99 species and subspecies. Bibliography of 41 titles. "North-south zonation x x x which might possibly be attributable to the effects of temperature, is far overshadowed by the east-west zonation, which results indirectly from differences in the amount of rainfall."

Natural History: Mammals of Quebec

Anderson, R. M. Mammiferes de la Province de Quebec, Societe Provancher (140 rue St. Jean, Quebec) Rapp. A nn. 1939 (1940), pp. 87-111, 1 map.

Revision, in French, of the list abstracted in WILDLIFE REVIEW, No. 21, May 1939, p. 17, the number of forms treated being raised (6) to 132. A sketch of the author, with portrait, is given on pp. 34-36.

Predation

Tyler, Bruce P. Predators in their relation to bird life, The Migrant (672 N. Belvedere, Memphis, Tenn.), 10(4), Dec. 1939, pp. 67-70, 1 table.

Function of predators in contributing toward balance illustrated by their use, natural and artificial, in insect control. The tabulation shows the frequency of occurrence of the principal prey items in stomachs of 8 species of hawks reported upon by the Biological Survey. Quotations are given from various authors as to the role and value of predators.

Predation: Armadillo vs. quail

[Gowanloch, James N.] Armadillos invading Louisiana are not quail enemies, Louisiana Conservation Review (Dept. of Conservation, Court Bldg., New Orleans, La.), Winter Issue 1939-40, pp. 7, 50, 1 fig.

Armadillos have been invading Louisiana for at least 10 years and have crossed the Mississippi River; limits of their known range are indicated. Damage to quail nests by cotton rats is often attributed to armadillos. The latter, however, are highly insectivorous and it is doubtful that they do much damage to quail. Investigations are being continued.

Predation: Hawks

Gowanloch, James N. Louisiana hawks are valuable, Louisiana Conservation Review (Dept. of Conservation, Court Bldg., New Orleans, La.), Winter Issue, 1939-40, pp. 23-34, 4 pls., 1 photo.

Discussion of groups of Louisiana hawks and vultures, their identification, economic status, and legal protection. The article embraces an annotated check list of the birds, a digest of recent articles on predation, and a bibliography of 29 titles. The weight of evidence is certainly against the teach-

ings of the "vermin" control school. The plates are reproductions of Peterson's excellent pictures made for the National Association of Audubon Societies.

Propagation: Partridge, Chukar

Barger, B. A. Breeding and rearing of chukar partridges, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 5(2), Feb. 1940, pp. 62-66, 1 fig.

Introductory paragraphs on native range, habits, and description, followed by a summary of Wisconsin experience, in sexing, penning, and breeding the birds, care of eggs, housing and feeding the chicks, and controlling diseases. Some 2,000 birds have been experimentally planted in Wisconsin and the results are being carefully observed for guidance of future procedure.

Propagation: Wild turkey

Fluke, Wm. C. Propagation wild turkeys in the wild, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(1), April 1940, pp. 4, 32, 2 photos.

Birds propagated on game farms would not "go wild", so the penning of hens accessible to wild toms was tried. The experiment, which is described, has resulted in notably wilder progeny.

Research: Banding pheasants

Olds, Hayden M. Ohio pheasant banding results 1930-1939, Ohio Division of Conservation (Columbus), Bul. 101, 14 pp., 7 figs., tables (mimeographed), March 1940.

History of miscellaneous pheasant banding activities, 1930-39, with the following summary: "(1) Wild trapped birds as well as artificially propagated birds used for restocking are taken in greatest number by hunters on the opening day of the hunting season; (2) wild trapped birds will return at least two miles to a refuge and because of this should be stocked at a greater distance in order to avoid a reconcentration; (3) the average distance traveled by banded wild trapped pheasants after being stocked, based on the travels of 56 such birds x x x is between 1-1/2-2 miles. It must be kept in mind that all of these returns are based on birds trapped and released in the same county (Wood); (4) no conclusion on life span or x x x ability to survive as compared to releases of artificially propagated birds is offered." Results for the intensified banding operations of 1939 are given separately. In that year, there was a staggered hunting season which, apparently, increased the kill 8.8 percent. "The longer the period of time that game is banded and released before the hunting season, the smaller the percentage of returned bands." The figures indicate the daily kill of pheasants in 4 regions of the State, and the accompanying legends state the number of birds banded, the percentage of returns, the average distance traveled, percentage of birds killed during the first 4 days of the open season, and other details. The distance traveled varied considerably by regions, a result for which interpretation is offered in the text.

The grand total of bands applied in 1939 was 10,333, that of returns 964, a percentage of 9.3.

Research: Food habits

Davison, Verne E. A field method of analyzing game bird foods, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 103-116, 7 tables.

Author's abstract: "The paper describes a field method which deviates from usual laboratory methods of determining game bird foods in order to facilitate the analysis of hundreds of crop contents. The study represents a winter period of from 4 to 6 months and is being conducted by Soil Conservation Service biologists in the southeastern United States. The relative significance of plants occurring in various agricultural habitats is determined by the contents of crops rather than of gizzards. A study of 100 to 200 crops for each period of 3 or more years is required to reach dependable conclusions. Examples are taken from more than 3,000 bobwhite crop records to illustrate the type of information obtained. The results of the entire study will be published later and their application may be varied for guidance of wildlife field workers who intend to manipulate plants for the benefit of a certain species of game bird."

Research: Marking beavers

Aldous, Shaler E. A method of marking beavers, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 145-148, 2 figs.

Author's abstract: "The marking of animals for future recognition is an important phase of any ecological study. With the hope of developing a usable method for beavers, ear tagging, tattooing of the tail and the webs of the hind feet, and punching holes in the webs were all tested. Ear tagging and tattooing were both unsatisfactory, but web punching proved to be a usable technique. The method employed was to punch holes in the webs of the hind feet with the three-eighths-inch cutter of a hand-operated leather punch. Each web was given a numerical value so that by punching one or more webs the desired number could be produced. Two codes are illustrated, one simple for use when only a few animals are to be marked, the other slightly more complicated but more satisfactory when larger numbers are involved. The same technique should be suitable for marking other web-footed species."

Research: Muskrat

Forbes, Thomas R., and Robert K. Enders. Observations on corpora lutea in the ovaries of Maryland muskrats collected during the winter months, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 169-172, 1 table.

Authors' abstract: "Evidence from histological examination of the ovaries, and especially of the corpora lutea, of 119 muskrats trapped in Maryland during the winters of 1938 and 1939 indicates that during these years the first ovulatory cycle of the annual breeding period occurred between the early part of February and the middle of March and that a second ovulatory cycle promptly ensued."

Research: Vibrometer

Odum, Eugene P., and S. Charles Kendeigh. The cardio-vibrometer: A new instrument for measuring the heart rate and other body activities of animals, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 21(1), Jan. 1940, pp. 105-106, 1 fig.

Description, illustrations, suggestions as to use.

WILDLIFE LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of the Interior, Washington, D. C.

BS-150. Suggestions for bird field study, by May Thacher Cooke, 7 pp., January 1940.

A revised edition of BS-76 (December 1936). Popularity of the study; availability of aids; time to begin; equipment; where and when to go; field identifications; note keeping; significance of the study; organizations; list of helpful books and pictures; addresses of their publishers, and prices.

BS-152. Suggested action program for sportsmen's organizations, 5 pp., February 1940.

Opportunities for cooperation in educational programs, in improving environment for wildlife, in restocking operations, in emergency winter feeding, and in the activities of State and Federal control and law enforcement programs.

BS-156. Ornamental woody plants attractive to birds, by Myer Katz, 18 pp., March 1940.

General considerations as to attracting birds with references to available publications. Alphabetical list of the more important genera of woody plants with notes on their ornamental value and their utilization by birds.

NOTES AND NEWS

A popular account of wildlife disease investigation by the Biological Survey with special mention of botulism, sylvatic plague, and tularemia appeared under the title of "Wildlife Doctor" in the National Sportsman for May 1940 (84(5), pp. 11, 26-27, 4 photos). The Doctor referred to is Dr. J. E. Shillinger, a portrait of whom is one of the illustrations.

Those who fear that the standard of wildlife conservation in the national parks may be threatened by assignment of the Wildlife Division of the National Park Service to the Biological Survey should be reassured by the terms of the memorandum of agreement signed by heads of the organizations concerned and approved by the Secretary of the Interior. It is herewith quoted:

"Among the chief functions of the National Park System has been that of preserving representative examples of the primitive wildlife of America. If the Department of the Interior is to continue to carry out this responsibility for the benefit of future generations as well as that of the present, the units of the park system must be administered in accordance with specific, distinctive principles. Believing that the objective of restoring and perpetuating the original fauna and its environment requires and is worthy of extraordinary measures, we advocate continuance of the established park policy of wildlife management:

"No management measure or other interference with biotic relationships shall be undertaken prior to a properly conducted investigation.

"Every species shall be left to carry on its struggle for existence unaided, as being to its greatest ultimate good, unless there is real cause to believe that it will perish if unassisted.

"Where artificial feeding, control of natural enemies, or other protective measures, are necessary to save a species that is unable to cope with civilization's influences, every effort shall be made to place that species on a self-sustaining basis once more; whence these artificial aids, which themselves have unfortunate consequences, will no longer be needed.

"No native predator shall be destroyed on account of its normal utilization of any other park animal, excepting if that animal is in immediate danger of extermination, and then only if the predator is not itself a vanishing form; when control is necessary it shall be accomplished by transplanting or, if necessary, by killing offending individuals, not by campaigns to reduce the general population of a species.

"Species predatory upon fish shall be allowed to continue in normal numbers and to share normally in the benefits of fish culture.

"The numbers of native ungulates occupying a deteriorated range shall not be permitted to exceed its reduced carrying capacity and, preferably, shall be kept below the carrying capacity at every step until the range can be brought back to original productiveness.

"Any native species or subspecies which has been exterminated from the park area shall be brought back if this can be done, but if said species or subspecies has become extinct, no related form shall be considered as a candidate for reintroduction in its place.

"Any exotic species which has already become established in a park shall be either eliminated or held to a minimum provided complete eradication is not feasible; and the possible invasion of the parks by other exotics shall be anticipated and steps taken to guard against the same.

"Presentation of the animal life of the parks to the public shall be a wholly natural one.

"No animal shall be encouraged to become dependent upon man for its support.

"Problems of injury to the persons of visitors or to their property or to the special interests of man in the parks, shall be solved by methods other than those involving the killing of the animals or interfering with their normal relationships, where this is at all practicable."

(Sgd) Arno B. Cammerer
Director, National Park Service

(Sgd) Ira N. Gabrielson
Chief, Bureau of Biological Survey

Approved: Dec. 4, 1939

(Initialed) H. L. I.
Secretary of the Interior

"Your National Parks--and you" is the title of a popular article by Victor H. Cahalane in Nature Magazine (33(5), May 1940, pp. 257-265, 303, 11 photos. 1214 Sixteenth St., N. W., Washington, D. C. 35 cents a copy), that gives attention to the care of wildlife among other problems of the Park Service in the most difficult part of its job, namely that of getting along with the great American public.

A press release of April 16 sums up the achievements of the Missouri Conservation Commission to date; it states that in addition to the organization of the department, the manning of the staff and the consideration and adoption of fundamental principles, there are now being carried on projects in game and fish development on 1,156 areas, aggregating 1,741,853 acres in cooperation with 22,311 owners in 99 counties. In the field of education there are in operation

projects in which fifty thousand farm youths of the state are actively engaged.

The Fact Finding Committee of the Montana State Fish and Game Commission (B. L. Price, Chairman) has issued a "Preliminary Survey of Research and Fact Finding Work done or in progress affecting the Wildlife of the State of Montana" (32 pp. mimeographed, Helena, Mont., 1940). In general the publication is a list of projects, details being given in only a few cases relative to animal parasites and diseases.

Two recent releases of the Ohio Wildlife Research Station (Ohio State University, Columbus) not abstracted may be of interest to readers of WILDLIFE REVIEW. The first is: "Wildlife Management Districts of Ohio" by E. L. Wickliff and Lawrence E. Hicks (Release 134, March 1940) which discusses physical conditions, wildlife, and hunting problems of each of the 7 regions under which the game administration of the State is conducted. The second publication referred to is a list and index to Releases 1-120 of the Station (No. 120a, February 1940).

Dartmouth College (Hanover, N. H.) has employed a naturalist (Richard L. Weaver) who gives his full time to extra curricular activities with the students and faculty. His duties are explained in the Bulletin of the Massachusetts Audubon Society (66 Newbury St., Boston, Mass., Jan. 1940), and the results achieved by the Dartmouth Natural History Club are detailed in the mimeographed Annual Report for 1939, presumably obtainable from Dr. Weaver at the College.

The British Trust for Ornithology has issued in bound form a collection of reprints (1935-9) mostly relating to population studies. Some of them are: "The Breeding Bird Population of British Heaths and Moorland," by David Lack; "A Census of Short-eared Owls," by T. Russell Goddard," two papers on food habits of the little owl by Miss A. Hibbert-Ware, and one on "The Habitat Distribution of British Woodland Birds," by David Lack and L. S. V. Venables. The volume includes also the article by J. C. F. Fryer on bird destruction of buds of trees and shrubs that was abstracted in WILDLIFE REVIEW, No. 24, November 1939, p. 18.

There are 23 different articles in all at the bargain price of 6 shillings. Obtainable from the Director, Edward Grey Institute of Field Ornithology, 39 Museum Road, Oxford, England.

Those interested in the value of weed fallow in tobacco production may consult a discussion of the matter in the Journal of Agricultural Research (59(11), December 1, 1939. Supt. of Documents, Washington, D. C. 15 cents a copy). In an article entitled,"Tobacco following bare and natural weed fallow and pure stands of certain weeds" (pp. 829-845, 5 figs., 9 tables), Messrs. W. M. Lunn, D. E. Brown, J. E. McMurtrey, Jr., and W. W. Garner report that

tobacco grown after weed fallow possesses in large measure those desirable characteristics of the crop grown on virgin land. Tobacco following ragweed and horseweed was markedly superior to that following bare fallow. Results of tests of other plants also are reported and a bibliography of 12 titles is given.

A directory of 1940 summer camps and biological stations is given in Turtox News for March (Vol. 18, No. 3, General Biological Supply House, Inc., 761-763 East 69th Place, Chicago, Ill.). It is arranged according to sections of the country and includes 50 entries for the United States. There are 6 also for Canada.

Trend of publication in the wildlife management field, 1936-39, inclusive. (Summarized from abstracts that have appeared in WILDLIFE REVIEW)

Subjects	Number of publications			
	1936	1937	1938	1939
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WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE FISH AND WILDLIFE SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

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Washington, D. C. No. 28 August, 1940

Bibliography: Federal publications

Schmeckebier, Laurence F. Government publications and their use, Brookings Institution (Washington, D. C. $3.00 a copy), Second, revised, edition, 479 pp., 1939.

The appearance of a revised edition makes an opportunity for calling attention to a useful work that should have been noted when first published in 1936. It is a comprehensive guide to its subject that in a foreword has the approval of the Federal Superintendent of Documents--high recognition, indeed. Chapter headings must suffice here to indicate the contents: Catalogs and indexes, bibliographies, classification, availability of publications, congressional publications, Federal and State constitutions, Federal laws, State laws, court decisions, administrative regulations and departmental rulings, presidential papers, foreign affairs, reports on operations, organization and personnel, maps, and technical and other department publications. An appendix lists depository libraries. There is a full index. The work is a manual on Federal publications and how to find them.

Bibliography: Fur trade

Cuthbertson, Stuart, and John C. Ewers. A preliminary bibliography on the American fur trade, U. S. Dept. of the Interior (Jefferson National Expansion Memorial, St. Louis, Mo.), 191 pp. (mimeographed), 1939 (1940).

Extensive bibliography subdivided on a geographic basis, the titles in the divisions arranged alphabetically by authors.

Bibliography: Science and society

Adams, Charles C. Selected references on the relation of science to modern life, New York State Museum (Albany), Bul. 322, pp. 79-96, 1940.

A section on "The cultural value of nature and science" includes 65 titles.

Biological Survey: Federal aid act

Day, Albert M. Federal aid in wildlife restoration. General information, U. S. Dept. of the Interior, Wildlife Circ. 3 (Supt. of Documents, Washington, D. C. 5 cents a copy), 11 pp., April 1940 (May).

Supersedes and has about the same contents as U. S. Dept. of Agriculture Misc. Publ. 350, "The wildlife restoration program under the Pittman-Robertson Act of 1937," which was abstracted in WILDLIFE REVIEW, No. 22, August 1939, page 2.

Classification: Grouse, Ruffed

Todd, W. E. Clyde. Eastern races of the ruffed grouse, The Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 57(3), July 1940, pp. 390-397.

Description of 3 new subspecies from the Appalachian Region, northern great plains, and northern Ontario, respectively, and comparative notes on the characters of the 8 known North American subspecies.

Classification: Rabbits

Orr, Robert T. The rabbits of California, Calif. Acad. Sci. (San Francisco) Occasional Papers 19, 227 pp., 10 pls., 30 figs., 1940 ($3.50 a copy).

Discussion of the characters of rabbits and their variations; key to 7 species (of 2 genera) occurring in California; the accounts of the species and subspecies include diagnosis, synonymy, statement of distribution, description of the various pelages, measurements, and in most cases life history, and reference to natural enemies. There is a 5-1/2 page list of literature cited.

Classification: Snakes, Pituophis

Stull, Olive G. Variations and relationships in the snakes of the genus Pituophis, U. S. National Museum Bul. 175 (Supt. of Documents, Washington, D. C. 35 cents a copy), 225 pp., 84 figs., 14 tables, 1940.

Monograph of the group of 6 species (13 subspecies) with key, synonymies, descriptions, illustrations, and discussions of range, variation, and relationships. These are the so-called bull, pine, and gopher snakes.

Conservation: Aims

Gabrielson, Ira N. Planning for wildlife restoration, Maryland Conservationist (514 Munsey Bldg., Baltimore, Md.), 17(2), Spring 1940, pp. 26-29.

Address given at the Fifth N. A. Wildlife Conference at Washington, D.C., March 1940. The speaker elaborated on the texts that all conservation programs are interrelated and that "we can have wildlife only by providing it a suitable place in which to live, and x x x we must keep our annual wildlife harvests below the annual production." The needs for a satisfactory national conservation program are: first, for research as a basis of management; second, the allotment of more lands where production of wildlife may be the primary enterprise; and third, a comprehensive educational effort to make the public conservation minded. Suggestions are made as to how all of these aspirations may be converted into realities. There is need, however, for patience as the processes by which restoration may be accomplished are necessarily time-consuming.

Conservation: By Federal agencies

Committee. The status of wildlife in the United States, U. S. Senate Special Committee on the Conservation of Wildlife Resources, 76th Congress, 3rd Session. Senate Report No. 1203, 457 pp., 74 pls., tables, 1940.

Statement by the Committee on its history, on the hearings held, and the legislation sponsored by it, and on its recommendations; these points are amplified in a special report by the Secretary of the Committee; the necessity of research is emphasized. The volume contains valuable reference material, including the text of Federal laws relating to the protection of wildlife (18 items covering 27 pages), tabulation of lands under control of the Biological Survey (266 parcels totaling 13,644,800 acres), tabulated estimate of big game and fur animals on national forests, and a list of game refuges on national forests (407 totaling 23,064,362 acres). The bulk of the volume is made up of contributions from Federal agencies whose work bears on wildlife conservation. That from the Biological Survey, written and compiled by H. P. Sheldon, comprises nearly a hundred pages. It is devoted chiefly to an exposition of the scientific work of the Bureau and of the waterfowl restoration program. The section provided by the Bureau of Fisheries (84 pp.) by Elmer Higgins and Rachel L. Carlson treats of the condition of commercial fisheries and angling resources, details governmental activities in relation to the fisheries, and discusses merits and deficiencies of the program. The Forest Service report (about 100 pages) by H. L. Shantz and John H. Hatton discusses inventories of big game on the national forests, which, in the period 1921 to date, have shown increases in all species except the mountain goat and bighorn. Objectives of wildlife management on the national forests are discussed and cooperation with other Federal agencies and with the States is detailed, in part by reproduction of existing working agreements. Forest and range research, grazing problems, and regional programs of wildlife management are described. Each of the 3 sections of the report thus far commented upon contains a bibliography of recent publications (official or unofficial, or both) by members of the respective staffs. The report of the National Park Service (31 pp.) was prepared by Victor H. Cahalane, Clifford C. Presnall, and Daniel B. Beard. It tells of national park policies in wildlife conservation and of their increasing effectiveness, details problems and accomplishments with key species, and briefly refers to wildlife conditions on numerous parks. Soil Conservation Service material furnished by Ernest G. Holt covers 18 pages in which are described a variety of lines of work of that organization in relation to wildlife. Briefer contributions are included from the Civilian Conservation Corps, Bureau of Reclamation, Office of Indian Affairs, Grazing Service, Agricultural Adjustment Administration, and the Land Classification Section of the Bureau of Agricultural Economics. All in all an interesting and valuable presentation of the accomplishments, objectives, and needs of the Federal wildlife conservation agencies.

Conservation: Humane trapping

Bailey, Vernon. Our fur bearing animals, National Humane Review (135 Washington Ave., Albany, N. Y.), 28(7), July 1940, pp. 6-9, 11 photos.

Chiefly on humane methods of trapping, including the use of chain-loop, killer, and cage traps. An accompanying article (pp. 3-5, 5 photos) is the latest of the annual reports on humane trap contests conducted by The American Humane Association. These papers are a mine of information on this important subject.

Conservation: Prairie chicken, Attwater's

Lehmann, Valgene W. Drums of the dying. The story of the Attwater prairie chicken, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 29(3), May-June 1940, pp. 147-149.

Today this subspecies is on the verge of extinction, few being left in Louisiana and only about 8,000 in Texas. More than 90 percent of their former range has been transformed by agriculture, and the remaining favorable territory is rapidly being despoiled. Only immediate establishment of large refuges can save the bird. The article includes notes on life history and enemies and a discussion of destructive agricultural practices and how they may be modified.

Control: Alligator grass

Penfound, Wm. T. The biology of Achyranthes philoxeroides (Mart.) Standley, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 24(1), July 1940, pp. 248-252, 2 figs.

Distribution, growth, vegetative and floral characters, the plant as a competitor, and suggestions as to its elimination. This study was made with relation to mosquito control but the findings are of interest to wildlife managers who are called upon to combat alligator grass as a competitor of wild fowl food plants. Sodium arsenite applied at the rate of 100 lbs. to the acre killed all current growth; repetition of the treatment is necessary to eliminate the plants.

Accompanying articles deal similarly with Dianthera americana and Saururus cernuus.

Control: Eagles

Marshall, William H. An "eagle guard" developed in Idaho, The Condor, (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(3), May-June 1940, p. 166, 1 photo.

Description and illustration of a simple device to keep eagles from alighting on power line perches installed at a cost of 20 cents per unit.

Control: Fish predators

Lagler, Karl F. Foul fowling?, Hunting and Fishing (27 Newbury St., Boston, Mass. 5 cents a copy), 17(8), Aug. 1940, pp. 9, 32, 4 photos.

At fish hatcheries each year about 50,000 birds and some 12,000 snakes, turtles, and miscellaneous animals are killed. This is undesirable destruction and suggestions are made as to the preferable control methods, including screening and wiring of hatchery waters.

Control: Pigeon, Wood

Alexander, W. B. The wood pigeon, Journ. Royal Agr. Soc. England (16 Bedford Square, London, W. C. 1, England), 100(3), 1940, reprint 9 pp., 1 map.

In winter the species occurs in large flocks which often do severe damage to root and green crops. Though sometimes augmented by flights from the continent, the flocks are usually of British origin. The diseases and enemies of the birds are discussed and control measures are recorded, including destruction of eggs and young and netting and shooting of adults. Wood pigeons are benefitted by game management procedures and by reforestation. The latter activity and also the creation of reserves favor the increase of predators and thus tend to load the other side of the balance. Organized shooting of adults seems the most promising means of control.

Control: Vultures

Anon. Wire traps for buzzards, Capper's Farmer (Capper Publications, Inc., Topeka Kans. 5 cents a copy), 51(4), April 1940, p. 33.

Pen of poultry netting 12 feet square with funnel built alongside on the ground and extending 4 feet into the pen. Entrance should be a close fit for the birds; in trying to get out they climb over it and do not find the opening. A hundred buzzards caught in 2 weeks. Another trap 20 feet high with the top open also was successful as the birds could not take wing again after alighting in it. Texas; brief remarks on damage done by attacking stock in parturition and their young.

Cycles: Hare, Snowshoe

Green, R. G., and C. A. Evans. Studies on a population cycle of snowshoe hares on the Lake Alexander Area. II. Mortalities according to age groups and seasons, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(3), July 1940, pp. 267-278, 2 figs., 8 tables.

Authors' abstract: "Data derived from systematic trapping and banding of snowshoe hares are used in calculating the age ratios of hares on the Lake Alexander Area, Minnesota, during the spring of each year from 1934 through 1939. Yearlings constituted about 60 per cent of the total population in 1934, 1935, and 1936. Later, this proportion was markedly reduced concurrently with the increase in severity of the 'die-off.' In 1937 only 44 per cent of the hares were yearlings. In February, 1938, young hares made up about 80 per cent of the population on the area; but inasmuch as the total population had been greatly reduced, this relatively high figure represents an actual decrease in number of yearlings as compared with the number the previous year. In 1939, when the population was about double that of the preceding year, yearlings again constituted about 80 per cent of the total population of hares. Age ratios were shown to be essentially the same on December 20, 1935, as on March 30, 1936, although there was a mortality of more than 45 per cent among the

hares on the area between those dates. Throughout the years studied annual mortalities calculated from February to February remained at a fairly constant level of about 70 per cent for both yearlings and older hares, irrespective of the cyclic changes in the population. A full appreciation of the significance of the data on age ratios and annual mortalities among adult hares in relation to population cycles is dependent upon information regarding reproduction of hares to be presented in the third paper of the series."

Destruction: Bison

Godsell, Philip H. The last round-up, Forest and Outdoors (610 Canada Cement Bldg., Montreal, Canada), 6(6), June 1940, pp. 174-175, 194-197, 3 photos.

Popular write-up of the destruction as a war measure of the Wainwright herd (21,000 animals); incidentally 1,500 elk, 500 deer, and 500 moose also are being killed. History of the buffalo herd and of the attempt to move part of it to the Wood buffalo territory along Slave River.

Destruction: Pheasants, young

Randall, Pierce E. Causes of juvenile mortality of the ringneck pheasant, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(3), June 1940, pp. 10-11, 28, 3 photos, 2 tables.

On a study area with 1 adult to 8 acres, the average number of eggs in a clutch was 10.8 and the average hatch 9.7. Reduction of the broods to an average of 8.5 each at 8 weeks or older is traced and the causes of mortality discussed and tabulated. The greatest single cause was mowing, 18.8%, and the most serious predator was Cooper's hawk, responsible for 10.4 percent of juvenile losses. A third of the total mortality remained unaccounted for.

Destruction: Whales

Murphy, Robert Cushman. Lo, the poor whale!, Science (Lancaster, Pa. 15 cents a copy), 91(2364), April 19, 1940, pp. 373-376.

Improved equipment has resulted in annually increasing slaughter of whales until one habitat after another has been depleted. Between 1920 and 1940 about half as many whales were killed as during the preceding 300 years together. In the last 30 years, more than 40 million 50-gallon barrels of whale oil has been rendered. "The number of whales being slain is at least fourfold what the oceans can endure on a long-term basis, yet the goal of reasonable, and hence perpetual, utilization seems farther off than ever."

Diseases and Parasites: Acarina

Cooley, R. A., and Glen M. Kohls. Two new species of Argasidae (Acarina: Ixodoidea), U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(21), May 24, 1940, pp. 925-933, 1 pl., 2 figs.

Ornithodoros dyeri from bat guano in Arizona (see accompanying abstract of an article by C. B. Philip), and Otobius lagophilus from rabbits in western States; description and illustration of all stages; comparative notes.

Diseases and Parasites: Acarina

Philip, Cornelius B. Ticks (Ornithodoros spp.) in Arizona bat "caves," U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(16), April 19, 1940, pp. 680-682.

Notes on bats and the ticks associated with them in Arizona. The bat guano tick O. coprophilus, so far as observed, appears unlikely to be concerned in transmission of disease to man; it is not yet known to parasitize bats.

Diseases and Parasites: Anaplasmosis

Boynton, Wm. H., and Gladys M. Woods. Anaplasmosis among deer in the natural state, Science (Lancaster, Pa. 15 cents a copy), 91(2355), Feb. 16, 1940, p. 168.

Columbian black-tailed deer near Mt. Hamilton, California, from which the disease was identified, apparently had acted as a reservoir of infection for cattle presumably through the intermediacy of the tick Dermacentor occidentalis.

Diseases and Parasites: Anthrax

Stiles, Geo. W., and C. L. Davis. Anthrax in minks, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(756), March 1940, pp. 407-409, 2 figs.

Review of literature of the subject (7 titles cited) and report on an outbreak of anthrax among ranch minks in Colorado; on one farm 500 animals died in 5 days. Symptoms and lesions are described. The disease probably was acquired from infected food. Ranch animals should not be fed the flesh of ailing livestock.

Diseases and Parasites: Botulism

Batson, H. C. Western duck sickness (botulism) in S. Dak., South Dakota Conservation Digest (S. Dak. Game and Fish Dept., Pierre), July 1940, pp. 6-7, 11-13, 14-16, 8 photos, 2 tables.

Review of the history of knowledge of botulism and tabulation of information on outbreaks in South Dakota, 1937-39; the first known outbreak in this State was in 1898. Cause of the disease, strength of the botulinus toxin, its effects upon birds, epidemiology of western duck sickness, treatment of affected birds, the fate of recovered ducks, control and prevention of botulism, and susceptibility of domesticated birds and man to the malady are discussed. This is an important article, making a distinct advance in knowledge of botulinus intoxication. The author demonstrates that many apparently recovered birds die

later from effects of the poisoning, that others remain carriers of the causative organism which they may introduce into previously uninfected waters, where it may kill birds not previously exposed. New light is thrown upon control measures though none really effective and practicable has as yet been developed.

Diseases and Parasites: Botulism

True, Gordon H., Jr. Duck disease, California Conservationist (State Dept. of Natural Resources, Sacramento, Calif. 15 cents a copy), 5(6), June 1940, pp. 1-3, 1 pl.

Historical account; notes on recent outbreaks in California, and on collecting and treating the sick birds; about 80 percent recover. A table shows the numbers of 21 species of birds found dead (1,879), or sick and treated (1,277), with the percentage of recovery, in 1939.

Diseases and Parasites: Cestoda, Diorchis

Schultz, Richard L. The genus Diorchis Clerc 1903, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 23(2), March 1940, pp. 382-397, 18 figs.

Catalog of 23 species, list of invalid specific names, enumeration of hosts (birds), descriptive key to the species (rostellar hooks illustrated), bibliography of 35 titles.

Diseases and Parasites: Cestoda, Oochoristica

Hughes, R. Chester. The genus Oochoristica Lühe 1898, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 23(2), March 1940, pp. 368-381.

Catalog of 45 species, list of invalid specific names, descriptive key to the species, list of hosts (reptiles and mammals), and 2-1/2 page bibliography.

Diseases and Parasites: Distemper

Wipf, Louis. Inclusion bodies in distemper, National Fur News (444 Seventeenth St., Denver, Colo. Monthly, $1.00 a year), 12(4), May 1940, p. 4, 2 figs.

Technic for identifying distemper by the inclusion bodies; instructions for shipping carcasses for autopsy.

Diseases and Parasites: Distemper, mink

Pinkerton, Henry. Immunological and histological studies on mink distemper, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. .75 cents a copy), 96(756), March 1940, pp. 347-355.

An epizootic disease identified as a strain of distemper differing from both the ferret and dog strains was seriously destructive on mink ranches in New England and New York in 1938. Laboratory studies of the malady and of immunization against it and treatment of it are reported. Bibliography of 6 titles.

Diseases and Parasites: Equine encephalomyelitis

Brandly, C. A. Birds as possible reservoirs of equine encephalomyelitis infection, North American Veterinarian (210 South Desplaines St., Chicago, Ill. 50 cents a copy), 21(2), Feb. 1940, pp. 95-96.

Review of literature (7 titles cited); the evidence as to birds serving as reservoirs of the disease is by no means satisfactory; further research is much needed.

Diseases and Parasites: Insecta, Mallophaga

Emerson, Mary C. Records of Mallophaga from Oklahoma hosts, Canadian Entomologist (R. H. Ozburn, Guelph, Canada), 72(5), May 1940, pp. 104-108.

Check-list of 65 species of these bird and mammal parasites, with host index.

Diseases and Parasites: Internal parasites

Harkema, Reinard. Internal parasites, Wild animals within wild animals, North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh, N. C.), 4(6), June 1940, pp. 12-14.

Brief popular account of the life histories of typical groups: coccidia flukes, tapeworms, and roundworms, with suggestions as to control.

Diseases and Parasites: Lead poisoning

Osmer, Thos. L. G. Lead shot: its danger to waterfowl, Scientific Monthly (Lancaster, Pa. 50 cents a copy), 50(5), May 1940, pp. 455-459.

History of knowledge of lead-poisoning from 1842; conditions under which lead pellets are ingested by ducks; surveys in Minnesota to determine the number of shot available showed an average density of 1.5 pellets to every square foot of lake bottom. "When the commercial production of a non-toxic shot becomes feasible the change should be made even if compelling legislation is necessary." It is inadvisable to use for refuges areas that have been heavily shot over.

Diseases and Parasites: Nematoda, Aproctella

Hamann, C. B. Notes on Aproctella nuda sp. nov., a filarioid nematode from the chimney swift, Chaetura pelagica (Linn.), American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 23(2), March 1940, pp. 390-392, 6 figs.

Description, illustration, comparative notes; type locality: Lafayette, Indiana.

Diseases and Parasites: Nematoda, Sarconema

Quortrup, E. R., and A. L. Holt. Filariasis in wild swans, Journ. American Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(757), April 1940, pp. 543-544, 1 fig.

Sarconema eurycerca in 10 of 42 whistling swans affected by lead poisoning in Utah; in one bird from Idaho the microfilariae apparently were the cause of death.

Diseases and Parasites: Nematoda, Thelazia

Oberhansley, Frank R. California mule deer a host for nematode eye worms in Sequoia National Park, Journ. American Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(757), April 1940, p. 542.

Thelazia californiensis; 50 in one eye; symptoms and lesions.

Diseases and Parasites: Plague

Hampton, Brock C. Plague in the United States, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(26), June 28, 1940, pp. 1143-1158, 2 tables.

"From the time of the first appearance of plague in the United States to January 1, 1940, there have been recorded 499 cases with 314 deaths." Rats as vectors receive frequent mention and plague infection in wild rodents, rodent parasites, and rabbits is the subject of a section of the paper, which includes a chronological record of plague infection in the animals mentioned, and a list of 30 forms of rodents and rabbits that have been found plague-infected. Bibliography of 13 titles.

Diseases and Parasites: Psittacosis

Meyer, K. F. Psittacosis, The Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 57(3), July 1940, pp. 330-332.

A peculiar type of pneumonia among inhabitants of the Faroe Islands has been identified with psittacosis; it is endemic in young Atlantic Fulmars. This article presents a list of birds (43) known to be spontaneously infected with psittacosis and discusses spread of the disease among humans.

Diseases and Parasites: Rodent-borne disease

Anon. An unidentified disease in Nevada believed to be transmitted by rodents, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(22), May 31, 1940, p. 988.

Occurrence in Ruby Valley, Nevada; description of symptoms of a disease of man that may be acquired from muskrats or beavers.

Diseases and Parasites: Tick, cattle-fever

Knapp, J. V. Existence of tropical variety of cattle-fever tick (Boophilus annulatus var. australis) complicates tick eradication, Journ. American Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(758), May 1940, pp. 607-608.

Synopsis of Florida law relative to cattle dipping. Tick eradication progressed satisfactorily until the deer-tick infested game preserves of Orange County were reached in 1931. There, while the program was halted, it was learned that the tropical variety of the cattle-fever tick propagates on deer as well as on cattle. It was evident that the deer must be removed to effect tick eradication. After necessary legal preliminaries, the deer were killed in 1938. Further authorization was obtained from the legislature to eliminate deer in Collier and Hendry counties and this work began in 1939. The Department of the Interior, however, refused to permit the killing of deer on the Seminole Indian Reservation in Hendry County, thus maintaining "a reservoir of cattle-fever ticks capable of spreading not only to the cattle of Florida, but to adjoining States as well." Bibliography of 6 titles.

Diseases and Parasites: Trauma

Long, William H. Traumatology in wildlife management, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 29(2), March-April 1940, pp. 88-92.

Mortality of game birds from crippling gunshot wounds; lesions, symptoms; treatment of birds recovered alive. A high percentage of crippled birds die but under laboratory treatment some disabled birds can be saved.

Diseases and Parasites: Trematoda, Collyriclum

Beaudette, F. R. A case of Collyriclum faba infestation in a purple finch, Journ. American Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(756), March 1940, pp. 413-414.

Summary of knowledge of this fluke; citation of 6 sources of information. Several species of wild birds are involved to which the author adds that named in the title of his communication. Description of the external cysts from which specimens were taken.

Diseases and Parasites: Trematoda, Neorenifer

Schmidt, Fred L., and U. Eugene Hubbard. A new trematode, Neorenifer serpentis, from the water moccasin, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 23(3), May 1940, pp.729-730, 1 fig.

From Lewisville, Ark.; description, illustration; comparative notes.

Diseases and Parasites: Trematoda, Schizostoma

Brackett, Sterling. Studies on schizostome dermatitis: V, Prevalence in Wisconsin, American Journ. Hygiene (615 North Wolfe St., Baltimore, Md. Single number of a section $1.00), 31(3), May 1940, Section C, pp. 49-63, 1 map, 4 tables.

Discussion of schizostome cercariae as the cause of "swimmer's-itch," with list of birds examined for schizostome adults and a tabulation of 10 species in which they were found. There is also a table naming the kinds of schizostomes known from vertebrates that occur in Wisconsin.

Diseases and Parasites: Tularemia

Anon. Tularemia, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(16), April 19, 1940, pp. 667-670.

The number of human cases and the number of deaths is increasing, indicating that further publicizing of methods of avoidance is required. The 1939 record is around 2,200 cases and 150 deaths; the disease is known in every State and the sources of human infection have been traced to 24 forms of American wildlife. Wild rabbits and hares are the direct cause of more than 90 percent of the human cases. Several other forms of wildlife are mentioned. Legislation designed to check the spread of tularemia by restricting the purchase and sale or handling of wild hares and rabbits has been enacted in at least 3 States--Connecticut, New Hampshire, and Ohio.

Diseases and Parasites: Tularemia

Davis, Gordon E. Bacterium tularense: its persistence in the tissues of the argasid ticks Ornithodoros turicata and O. parkeri, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(16), April 19, 1940, pp. 676-680, 3 tables.

Report on laboratory studies. Author's conclusions: "1. Bact. tularense may survive for at least 674 and 701 days, respectively, in the tissues of Ornithodoros turicata and O. parkeri, but is not transmitted during feeding. 2. The virulence of the organism was not adversely affected by the long period of residence in these ticks nor by the failure of the ticks to receive a blood meal."

Diseases and Parasites: Tularemia

Hammersland, H. L., and E. M. Jonoschild. Tularemia in a beaver, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(754), Jan. 1940, pp. 96-97, 1 photo.

Montana; post-mortem findings; details of laboratory identification.

Diseases and Parasites: Tularemia

Scott, John W. Natural occurrence of tularemia in beaver and its transmission to man, Science (Lancaster, Pa. 15 cents a copy), 91(2359), March 15, 1940, pp. 263-264, 1 table.

Numerous dead beavers were found in Sheridan County, Wyoming, in the fall of 1938; autopsy of one of them resulted in a tentative diagnosis of tularemia. Two persons handling the animals contracted the disease; their experience is described.

Diseases and Parasites: Of game birds

Cowan, Ian McTaggart. Two apparently fatal grouse diseases, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(3), July 1940, pp. 311-312, 1 pl.

Author's abstract: "In 1938-39 on Vancouver Island, British Columbia, outbreaks of two apparently fatal diseases occurred among game birds. Ruffed grouse (Bonasa umbellus sabini) and California quail (Lophortyx c. californica) were found with heavy infestations of the mite Cnemidocoptes mutans involving the legs, feet, and sometimes the breast skin. Advanced cases showed great hypertrophy of the dermal and epidermal tissue of the feet and legs, followed by ulceration and sloughing of the digits. Sooty grouse were found to have apparently contagious malignant skin tumors on the head. Beginning in the naked areas about the eyes and beak the tumors spread until the eyes were occluded and death followed. These tumors were diagnosed as low grade papillary carcinomata."

Diseases and Parasites: Of game birds

Shillinger, J. E., and Don R. Coburn. Diseases of game birds, in Poultry Practice (Veterinary Magazine Corporation, Chicago, Ill. 160 pp., illus. 1940. $1.00 a copy), pp. 143-145.

Practically all of the common diseases of poultry may infect game birds. They are seldom observed in the wild but are a serious problem on game farms. Avian tuberculosis, ulcerative enteritis (quail disease), rhinitis (snuffles), enterohepatitis (blackhead), coccidiosis, trichomoniasis, nutritional deficiency diseases, and cannibalism are discussed, including notes on symptoms and suggestions for treatment.

The essays in this book have been or are to be printed in the magazine Veterinary Medicine (7632 S. Crandon Ave., Chicago, Ill. 50 cents a copy). That here abstracted appeared in Vol. 35, No. 1, Feb. 1940, pp. 124-127. The article by Everett E. Wehr on "Nematodes of domestic fowls transmissible to wild game birds," from Veterinary Medicine for January 1940, abstracted in WILDLIFE REVIEW, No. 27, May 1940, p. 9, forms the chapter preceding that by Shillinger and Coburn in the book cited, of which it forms pp. 136-142.

Diseases and Parasites: Of rats

Herman, Carlton M. A parasitological survey of wild rats in the New York Zoological Park, Zoologica (New York Zoological Park, New York, N. Y.), 24(3), Nov. 1939, pp. 305-308, 1 table.

Synopsis of previous American surveys of rat parasites. Statement of methods in the present investigation and of results which are also tabulated. Two hundred rats were examined and 2 species of protozoans, 2 of nematodes, and 3 of cestodes found. One of the nemas (Capillaria hepatica) occurred in 91.5 percent of the adult rats. "No parasites were found in 52.5% of the young rats while only 5.6% of the adults were free from infection."

Ecology: Animal relations to soils

Jacot, Arthur Paul. The fauna of the soil, Quarterly Review of Biology (Williams and Wilkins Co., Baltimore, Md. $1.50 a copy), 15(1), March 1940, pp. 28-58.

Review of its subject accompanied by a bibliography of 104 titles. The matter on vertebrates fills about 2-1/2 pages. Mammals influence the soil by manuring, trampling, mixing, and channelling; and birds by manuring and scratching; instances are cited. The reptiles and batrachians receive briefer treatment. The bibliography is notably incomplete but the editor states that it was to have been enlarged, a plan terminated by the death of the author.

Ecology: Census methods

Graham, Samuel A. The intersection method of counting animals, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(3), July 1940, pp. 313-314.

Author's abstract: "This paper describes a method of enumerating by the intersection of lines drawn from known points in the direction of sounds produced by the animals. Use of the method is illustrated by tests made in locating drumming grouse. Although it is not always possible to be certain of the direction from which a sound emanates when it is heard only once, repetitions practically always clear up any doubts. For grouse and most other birds, observations must be made before daylight because after dawn the animals may move about and drum from various locations."

Ecology: Census values

Pulling, Albert Van S. The animal "census," Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(3), July 1940, pp. 327-329.

Author's abstract: "There is doubt as to the accuracy of the term 'census' as applied to wild animals, the author preferring 'estimate' to 'census.' The name, however, is not important and the 'census' itself may not

be. This is especially true if little is done about the 'census' after it is made. The terms 'saturated', 'abundant', 'common', 'rare', or 'scarce', 'remnantal', and 'exterminated' are suggested as alternates to numbers, with ecological site factors to show optimum habitat capacity. The futility of 'censusing' cyclic forms is stressed, admitting that a maximum of scientific effort has been spent on the highly cyclic grouse. There is a hint that some budding game managers have made counts because they did not know what else to do. Training is urged to make it possible for game managers to read 'sign' like the old trapper, and estimate abundance along with carrying capacity. Correct observations and intelligent interpretation of those observations are the bases of all conservational science. If wildlife specialists learn to observe animals and to interpret animal signs in a specific environment, the hypothetical barometer of population will tell the numbers well enough for all ordinary management purposes, and the effort toward a 'census' may be quite unnecessary."

Ecology: Insects of the forest floor

Kulash, Walter M. Insects of the forest floor available as food for game animals, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 38(7), July 1940, pp. 554-557, 1 table.

Report on the insects found in litter in samples taken at weekly and bi weekly intervals in 6 types of forest cover. The numbers of insects and spiders in the samples and estimated population per acre (excluding spring-tails, psocids, and thrips) are tabulated. The estimates vary from less than a million (larch type) to nearly five millions (alder bottom type). The insect-eating warm-blooded vertebrates of the locality (Mt. Toby, Mass.) are listed and their probable predation on the forest-floor insects discussed. Bibliography of 8 titles (which does not include important works by Jacot and Wolcott).

Ecology: Overgrazing

Smith, Charles C. The effect of overgrazing and erosion upon the biota of the mixed-grass prairie of Oklahoma, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 21(3), July 1940, pp. 381-397, 22 tables.

Of interest to wildlife managers are the sections on birds and mammals and the author's recommendations for deferred rotational grazing. Birds of the undisturbed prairie do not persist long under conditions produced by over-grazing. Overgrazed pastures were resorted to for feeding, however, probably on account of the increased population of grasshoppers. Moderately grazed prairies were found to have a larger number of nesting meadowlarks than undis-turbed prairie. [Nesting success was not determined.] Burrowing mammals were more tolerant of conditions produced by overgrazing than are forms living wholly above ground. "The total number of species of small mammals is greates in undisturbed prairie and least in overgrazed and eroded areas. The least abundance of all small mammals is reached in the severely overgrazed but uneroded areas and again increases when erosion begins and new plants invade

the community. Animals favored by a sparse, weedy vegetation show their greatest abundance on the eroded areas. In this group are found deer mice, pocket mice and cottontail rabbits. Ground squirrels and jackrabbits are especially favored when the taller grasses are eliminated from the vegetation, leaving a dense mat of short grasses and clumps of forbs. When overgrazing kills out much of the short grass, broomweed becomes the dominant species of plant. Under such conditions the number of jackrabbits decreases." Bibliography of 14 titles.

Ecology: Populations, mouse, jumping

Blair, W. Frank. Home ranges and populations of the jumping mouse, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 23(1), Jan. 1940, pp. 244-250, 1 table.

Study of Zapus h. hudsonius in Michigan, reported under the headings: ecological associations, methods, sex ratio (about even), breeding (spring and autumn seasons), preparation for hibernation, home ranges, and populations. The average size of home ranges (which overlapped considerably) was about .9 acre for both sexes. From 1 to 29 individuals were live-trapped weekly on nine acres of bluegrass association; the average period of residence was 3 weeks.

Ecology: Populations, shrew, short-tailed

Blair, W. Frank. Notes on home ranges and populations of the short-tailed shrew, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 21(2), April 1940, pp. 284-288.

Report on a trapping study in Livingston County, Michigan. Description of the environment, methods of work, notes on mortality in the traps (25-30 percent the first night, little thereafter), sex ration (51:49), and breeding. The home ranges varied from less than an acre for females to 4.43 acres for a male. Populations in late summer varied from 0.8 to 2.2 individuals per acre. Bibliography of 10 titles.

Ecology: Short grass plains

Larson, Floyd. The role of the bison in maintaining the short grass plains, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 21(2), April 1940, pp. 113-121.

Review of evidence as to the numbers of bisons which the author thinks were great enough to cause overgrazing. The effect of these animals was, therefore, the same as that of the cattle that replaced them. As the buffalos were part of the original biome, the prevalence of short grass which they brought about must be considered as a climax condition, not as an unnatural one due to livestock. Bibliography of 23 titles.

Economics: Beaver

Anon. Beavers water his cattle, Capper's Farmer (Capper Publications, Inc., Topeka, Kans. 5 cents a copy), 51(4), April 1940, p. 64.

A farmer in Wheeler County, Texas, is quoted to the effect that he would have to spend at least $1,000 for wells if it were not for the beavers making stock-watering places by their dams. Live beavers are worth from $100 to $150 a pair for stocking purposes. In some places the animals' tree-cuttir may be objectionable but where they live on small willows on stream banks, beavers help to keep down the growth so the land can be grazed.

Economics: Beaver

Gustin, Wade M. Beaver pay for life with tax-free dams, Western Farm Life (1520 Court Place, Denver, Colo.), 42(9), May 1940, p. 9.

Depleted beaver habitat in the northwest is being restocked, the animal are taking hold, and building "hundreds of dams" that will provide more irrig tion water for the farmers of Idaho, Oregon, Washington, and Montana. "Each beaver, if properly placed is worth $300 x x x according to Idaho Game Direct Owen W. Morris."

Education: Conservation

Anon. Boy Scouts in conservation, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(4), July 1940, pp. 13, 16, 32, 2 photos.

Notes on scout activities in posting signs, building bird houses and game shelters, planting willows, and feeding wildlife in winter, with suggestions on what to do and how to do it.

Education: Conservation

Calhoun, W. T., et al. Conservation and the Wisconsin teacher, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 5(4), April 1940, pp. 47-66, illus.

Educational suggestions, references to materials, and news notes under the following main headings: "Let's make bird life interesting to boys and girls," "A truly successful bird project," "Why not form a junior Audubon Club?" and "Teaching conservation in the senior high schools."

Education: Conservation, in 4-H clubs

Marston, Burton W. Wild life and the 4-H clubs, Wyoming Wild Life (Wyoming Game and Fish Commission, Cheyenne), 5(6), June 1940, pp. 4-5.

For 4 years Wyoming girls and boys of 10-20 years of age have participated in wildlife activities of the 4-H Club program and learned about conser

vation at Club meetings and camps. Some of the projects engaged in are the rearing of pheasants and fishes, and the making of exhibit collections of native shrubs, wild flowers, and insects.

Food Habits: Deer damage

Dale, Bonnycastle, Jr. Too many deer, Rod and Gun in Canada (1224 St. Catherine St., W., Montreal, Canada. 10 cents a copy), 42(1), June 1940, pp. 15-37, 3 photos.

Subtitle: "To farmers and orchardists the white-tailed deer has become a rampant pest." The animals were introduced into Nova Scotia in 1894 and were totally protected for 22 years, during which period they increased and spread to all parts of the Province. Farmers demand their extermination. The reported legal kill since 1916 is well over 37,000 animals, poaching has accounted for a great many, and bears and bobcats take a toll. Damage continues, however, and preventive measures have little effect. A fence with strands of barbed wire spaced 4-6 inches up to the 4-foot level, and 10 inches apart from that height to the top of 6 and 7 foot posts protected a garden. Potatoes, carrots, and other vegetables, and orchard trees are damaged. The animals have direct and indirect economic values, however, that should be taken into consideration in connection with the formulation of public policy toward them.

Food Habits: Nutritional requirements, mink

Smith, S. E., and J. K. Loosli. Some nutritional studies with mink, National Fur News (444 Seventeenth St., Denver, Colo. Monthly, $1.00 a year), 12(4), May 1940, pp. 3, 14.

Progress report on studies by the Biological Survey and cooperators; 6 adult minks on a diet free from vitamin C for a year showed no sign of scurvy; food may traverse the alimentary tract of a mink in 15 hours; raw meats are better digested than canned products; fats from all sources, however, are well digested; starch is digested but seems to cause diarrhea; vitamin D and an adequate supply of phosphorus and calcium are required for proper bone building.

Food Habits: Nutritive value of deer antlers

Chaddock, T. T. Chemical analysis of deer antlers, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 5(6), June 1940, p. 42.

Antlers shed annually in large numbers are rarely found, hence it is assumed that they are eaten, most probably by rodents. Analysis of an antler from a 3-year buck is given. It shows that common salt is not the attraction. "It is very interesting to note from the analysis that three important constituents in the deer antlers would be of food value. They are protein, 34.50%; phosphoric oxide, 19.28%; and calcium oxide, 25.26%. It would be readily possible for a rodent to find a food that would be fairly high in protein, such as nuts and grains, but those that are high in available calcium and phosphorus are not abundant. Since rodents are equipped with an excellent set of

incisors, they are capable of devouring these antlers quite easily, while othe animald are not."

Food Habits: Nutritive value of deer browse

Hellmers, Henry. A study of monthly variations in the nutritive value of several natural winter deer foods, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(3), July 1940, pp. 315-325, 1 pl., 8 figs., 8 tables.

Author's abstract: "Samples of eight species of woody plants browsed b deer were collected at monthly intervals and analyzed chemically to detect variations in their composition. Marked differences were found, especially in protein, nitrogen-free extract, and crude fiber, all of which exhibited trends indicating reduction in nutritive value of the plants through the winter. As a result of this study, it is believed that a representative index to the nutritive value of winter browse may be most easily and most satisfactorily obtaine by collecting material monthly and analyzing composite samples made by mixing the original samples of each species in equal proportions. The samples should be collected at least in duplicate, so that errors in sampling may be revealed This method tends to reduce errors that would be caused by fluctuations and seasonal trends. A few of the species analyzed compared very favorably in chemical composition with bluegrass and timothy. Most species, however, were considerably below these grasses in nutritional qualities."

Food Habits: Utilization of mast

Shaw, Earl B. Geography of mast feeding, Economic Geography (Clark University, Worcester, Mass. $1.50 a copy), 16(3), July 1940, pp. 233-249, 11 figs.

An article of interest to wildlife managers as indicating the prevalenc and distribution of mast-feeding of hogs. Deer as competitors and wolves as predators are incidentally mentioned. A map (Fig. 8) shows the principal mast feeding areas in the United States, including chiefly northern California, the Ozark and Appalachian regions, and the longleaf pine area.

Food Habits: Of deer, white-tailed

Ward, Henry B. [Deer feeding habits], Virginia Wildlife (Blacksburg, Va.), 3(10), June 1940, p. 5.

Showing special relish for peach tree browse, Naushon Island, Mass.

Food Habits: Of eagle, bald

Murie, Olaus J. Food habits of the northern bald eagle in the Aleutian Islands, Alaska, The Condor (J. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(4), July-Aug. 1940, pp. 198-202, 2 tables.

Remains of prey collected about nests in 1936 and 1937 were identified; the determinations and frequencies of occurrence are tabulated in this article. Birds preponderate in the eagle's diet, with mammals, and fishes next. Reference is made to the payment of bounties on eagles in Alaska. Depredations are discussed and the opinion expressed that in the Aleutian chain the bald eagle is "harmless so far as man's commercial interests are concerned."

Food Habits: Of English sparrow

Kalmbach, E. R. Economic status of the English sparrow in the United States, U. S. Dept. of Agriculture, Technical Bul. 711 (Supt. of Documents, Washington, D. C. 15 cents a copy), 66 pp., 3 pls., 7 figs., 7 tables, June 1940 (July).

Although including discussion of the introduction and spread, and of the general habits of the bird, this publication deals chiefly with the economic tendencies of its food habits. The study was based on examination of about 8,000 stomachs, far more than have been available for any other economic report on a single species. Food is discussed under numerous categories of which "feed" or grain picked up about poultry yards, corrals, and similar places is the largest single item in the annual diet (nearly 60 percent). The only other items that bulk at all impressively are oats (other than those in feed) and grass and weed seeds. The birds are so numerous locally that consumption of minor foods may assume importance. Favorable local variations in feeding habits are exemplified. The dietary changes rapidly from a 90 percent animal basis during the first 3 days of life to 50 percent at a week of age. The contrast between nestling and adult rations is fully discussed. The quantity of food eaten; the rapidity of digestion; distribution of diseases, parasites, and insect pests; competition with native birds; and factors controlling abundance, also are considered. There is a bibliography of 42 titles.

Author's conclusion: "It would have been better for the interests of American agriculture, as well as for the welfare of the native birds, had the English sparrow never been introduced; but now that it has long been established beyond the possibility of eradication, it must be dealt with accordingly. Control measures, though often called for, should always be limited to the need of the occasion. The dictates of sound economy demand this; but it is well to restate one of the findings of this study, namely, that at times the English sparrow has been an aid in local insect suppression. There is likelihood that such conditions will again arise."

Comment: A difficulty in connection with control of English sparrows that should never be forgotten is that the public practically does not distinguish this so-called sparrow from numerous species of native finches. Highly selective methods should, therefore, always be sought.

Food Habits: Of gull, Franklin's

Saugstad, Stanley. Feeding habits of the Franklin's gull in North Dakota, North Dakota Agr. Expt. Sta. (Fargo) Bi-monthly Bul. 2(5), May 1940, pp. 14-16, 2 figs.

Review of previously published information and report on 10 crop and gizzard contents. The food in the latter was chiefly grasshoppers. Biological Survey refuges have increased the number of birds in the State and the gulls have a useful but not controlling influence on the numbers of the principal insects they consume.

Food Habits: Of hawk, sharp-shinned

Munro, J. A. Food of the sharp-shinned hawk, The Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(3), May-June 1940, pp. 168-169, 1 table.

List of 13 species of birds and one of mammal identified from pluckings near a nest; also report on examination of the stomachs of 3 nestlings containing only bird remains.

Food Habits: Of jay, blue

Gesell, Arnold. Blue jay: brigand or benefactor, Scientific Monthly (Lancaster, Pa. 50 cents a copy), 50(6), June 1940, pp. 540-542.

Popular article mostly on the blue jay's utilization of nuts and acorns with extracts from publications and letters.

Food Habits: Of mammals, small

Hamilton, W. J., Jr., and David B. Cook. Small mammals and the forest, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 38(6), June 1940, pp. 468-473, 1 fig., 2 tables.

Certain references to the utility of small mammals through their feeding habits are available but in general the subject has been neglected. The authors name the common small mammals of northeastern forests, briefly describe their habits, and summarize information on their populations. It is estimated that a population of 100 individuals of the 6 most constant species could consume 266 pounds of insects per year. The number of insects might approximate 10,000 to the pound. Because of their far larger numbers, small mammals are doubtless of greater economic importance than the birds. Improvement of soil and providing food for fur animals are other useful roles of the small mammals. Suggestions are given as to how these animals may be favored in forests. Bibliography of 20 titles.

Food Habits: Of newt

Hamilton, W. J., Jr. The feeding habits of larval newts with reference to availability and predilection of food items, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 21(3), July 1940, pp. 351-356, 2 figs., 2 tables.

Comparison of results of analyses of 300 random samples of available food items with those of a like number of stomach contents. The larval newts were most interested in active organisms; leading categories were ostracods, chironomid larvae, and small univalves and bivalves. The data indicate "that the newts feed upon small macroscopic organisms in direct ratio to their availability and accessibility." Bibliography of 7 titles.

Food Habits: Of owl, barn

Davis, Wm. B. Another heavy concentration of Cryptotis in Texas, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(2), May 1940, pp. 213-214, 1 table.

Of 152 animals represented in 25 pellets, 102 were Cryptotis parva. One pellet contained remains of 20 Cryptotis and of 4 other small animals. All food items identified are listed; 11 are birds.

Food Habits: Of owl, barn

O'Reilly, Ralph A., Jr. Beneficial feeding habits of the barn owl, Cleveland Bird Club (Cleveland Museum of Natural History, Cleveland, Ohio), 36(2), March-May 1940 (July), pp. 8-9, mimeographed.

Seventy pellets collected near Brookville, Ohio, in the summer of 1939 contained only mammal remains to the number of 136, of which 104 were those of meadow voles.

Food Habits: Of owl, great horned

Bond, R. M. Food habits of horned owls in the Pahranagat Valley, Nevada, The Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(3), May-June 1940, pp. 164-165, 1 table.

Report on contents of 234 pellets collected at a nesting site. Numerically, mammals constituted 96.81 percent of the prey individuals identified and birds 3.19 percent. Meadow mice were by far the most numerous single item.

Food Habits: Of owl, short-eared

Moulthorp, Philip N. Lost Nation Road short-eared owl hunts the open fields, Cleveland Bird Club (Cleveland Museum of Natural History, Cleveland, Ohio), 36(2), March-May 1940 (July), p. 9, mimeographed.

Pellets, number not stated, presumably from near Cleveland contained remains of 222 mammals, 138 of them meadow voles, and of 4 birds.

Food Habits: Of pheasant, ring-necked

Grimmer, W. F. Food habits of the pheasant in Wisconsin, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 5(4), April 1940, pp. 10-13.

Summary of published information on the food of the bird in its native home, and in various States of the U.S.A. Report on contents of 8 crops and 4 gizzards of Wisconsin birds, including lists of seeds and fruits identified. The bird is regarded as doing good through its food habits.

Food Habits: Of rabbit, European

Eden, A. Coprophagy in the rabbit, Nature (St. Martin's St., London, W. C. 2, England. 1 shilling a copy), 145(3662), Jan. 6, 1940, pp. 36-37.

The relation of coprophagy to physiological experiments; apparently this habit may involve from 54 to 82 percent of the feces.

Food Habits: Of rabbit, European

Southern, H. N. Coprophagy in the wild rabbit, Nature (St. Martin's St., London, W. C. 2, England. 1 shilling a copy), 145(3668), Feb. 17, 1940, p. 262.

This habit, noted in captivity, is indulged in also by wild rabbits; instances are described. It is suggested that the practice may aid the animal to survive when forced to remain in their burrows. They are known thus to lie up for periods as long as a week.

Food Habits: Of rabbits

Pearce, John, and L. H. Reineke. Rabbit feeding on hardwoods, U. S. Forest Service, Northeastern Forest Expt. Sta. (New Haven, Conn.) Technical Note 35, 3 pp., 4 tables, mimeographed, June 1940.

Observations in plantations in Massachusetts showed that cottontail "rabbits distinctly prefer Kentucky coffee tree, honey locust, and hardy catalpa to black locust, hackberry, and red mulberry, this preference being reflected by both frequency and intensity of feeding." In a natural stand in Maine "the avoidance of balsam fir," by snowshoe rabbits, "was so complete that a positive aversion to the species may be indicated. Paper, gray, and yellow birches were avoided almost as completely as the fir, while pin cherry and witch-hazel held rather small attraction. x x x beech and the three maples [sugar, red, striped] were definitely preferred to birches, fir, and others." Serviceberry was invariably gnawed. The results of the studies are presented also in tabular form.

Food Habits: Of squirrel, red

Hayward, C. Lynn. Feeding habits of the red squirrel, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(2), May 1940, p. 220.

Tamasciurus hudsonicus ventorum extracting seeds from cones of Douglas fir (Pseudotsuga mucronata).

Food Habits: Of weasel, mountain

Bryant, M. D. Habits of the mountain weasel, Yosemite Nature Notes (Yosemite National Park, Calif.), 19(5), May 1940, p. 36, 1 fig.

Mustela a arizonensis capturing ground squirrel (Citellus beldingi) and pocket gopher. Notes on territories and hunting methods.

Introductions: Goat, Rocky Mountain

Swift, Lloyd W. Rocky Mountain goats in the Black Hills, South Dakota Conservation Digest (South Dakota Game and Fish Dept., Pierre), June 1940, pp. 8-9, 1 photo.

From 2 or 3 animals that escaped from Custer State Park zoo in 1924 has built up a herd of 25. Their headquarters is Harney Peak.

Introductions: Partridge

Gerstell, Richard. The Hungarian and chukar partridge[s]. Their status in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11 (3), June 1940, pp. 3, 32, 1 photo.

Hungarian partridges first introduced by the Commission in 1925 were substantially established by 1929-30. An open season where the birds were most numerous was permitted in 1939. The bird appears to be a permanent reliance as a game species although it can hardly be depended upon except in areas primarily devoted to the production of small grains. The total cost of introduction is calculated at $131,000. The chukar partridgesbrought in during 1936 and 1937 rapidly dispersed and eventually disappeared. Private efforts to establish the species also failed.

Life Histories: Birds

Bent, Arthur C. Life histories of North American cuckoos, goatsuckers, hummingbirds, and their allies, U. S. National Museum Bul. 176 (Supt. of Documents, Washington, D. C. 75 cents a copy), 506 pp., 73 pls., 1940.

The 12th volume in this series which compiles published and unpublished contributions besides the author's personally gathered information in accounts of each species that deal with habits, nesting, young, plumages, food, voice, distribution and migrations, and other features of the life history so far as the material will permit. An indispensable boon to the working ornithologist.

Life Histories: Condor, California

Robinson, Cyril S. Notes on the California condor collected on Los Padres National Forest, California, U. S. Forest Service (address Regional Director, San Francisco, Calif.), 18 pp. (mimeographed), frontispiece, map, 1940.

Observations on the only considerable colony (about 50) of the birds now known as to appearance, habits (especially feeding), natural enemies, and man as an enemy. The present and former ranges of the species are discussed. Plans with respect to study and protection of the bird also are outlined.

Life Histories: Cottontail

Anderson, R. M. The spread of cottontail rabbits in Canada, Canadian Field-Naturalist (Wilmot Lloyd, 582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 25 cents a copy), 54(5), May 1940, pp. 70-72.

Some invasion from a planting in New York, but mostly spread encouraged by clearing incidental to farming operations. In Manitoba the animals extended their range 250 miles northwest in 25 years. Details of the spread are given for various provinces and the subspecies concerned are named and briefly characterized.

Life Histories: Cottontail

Boule, John D. Cottontail nesting study in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(2), May 1940, pp. 10-11, 28, 3 figs.

Nesting activities were noted from April 6 to September 14; the largest numbers of nests were found in wastelands and in alfalfa; the cavities and nest structure are described: in 25 litters the numbers of young varied from 3 to 8, averaged 5.42; maternal care is discussed; nest destruction involved 9 of 25 nests, the chief agents being skunks and men; parasitism by a flesh fly destructive to the young is commented upon at some length. Bibliography of 9 titles.

Life Histories: Deer, Mule

McLean, Donald B. The deer of California, with particular reference to the Rocky Mountain mule deer, California Fish and Game (Terminal Island, Calif.), 26(2), April 1940 (Aug.), pp. 139-166, figs. 59-72.

Origin and characters of deer; distribution of the animals in the western hemisphere and in California (mapped); general statements as to migrations, life histories, predators, and diseases. The ranges in square miles, the percentage of the whole occupied, the average number of individuals per square mile, and the total population, of each of 6 forms are tabulated. More than four-fifths of the article is devoted to the mule deer, distribution, food habits, and antlers and pelage, receiving special attention. A report on a mule deer study deals more fully with sex ratios, age classes, migrations, rut, enemies, parasites, diseases, and less intensively with fawn habits, speed, stride, and jumping ability of adults, and reactions to scenting and sighting man. Bibliography of 15 titles.

Life Histories: Dove, Mourning

Moore, George C., and Allen M. Pearson. Mourning dove migrations from Alabama, Alabama Game and Fish News (Dept. of Conservation, Montgomery, Ala.), 11(12), June 1940, pp. 7, 13, 1 fig., 1 table.

Tabulation and map based upon 15 returns from some 2,400 banded birds. Maryland, Missouri, and Florida include the most distant points reached. In earlier days Federal protection of the mourning dove was challenged on the ground that the bird is not migratory; if there still be those unreconstructed on the point, this paper should help to win them over.

Life Histories: Dove, White-winged

Neff, Johnson A. Notes on nesting and other habits of the western white-winged dove in Arizona, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(3), July 1940, pp. 279-290, 1 pl., 4 tables.

Author's abstract: "Besides nesting individually and locally, the white-wings gather into communities in the thick mesquite or tamarisk growth of the river bottoms; such colonies reported as numerous some years ago are now apparently rare; two, in which most of the observations were made, are described. Nests were studied by means of a mirror fixed to one end of a light pole cut into three four-foot sections and joined by ferrules. With this apparatus it was possible to classify with accuracy the contents of nests up to the heights of 18 feet above the ground. Mortality and predation are discussed. Interference by man and by Indian horses and cattle caused mortality as when disturbed the adults departed from nests so explosively that eggs and young were frequently dislodged.' Tables summarize the contents of 661 nests. The season of nesting ranges from April 13 to August 27, with the young departing from the later nests by September 17. Apparently there are two distinct broods in the nesting thickets; young from the first brood were largely gone from the nests by July 1, while those of the second brood left the nests in late July and early August. In areas where conditions are unfavorable it appears that only one brood is produced. Nesting habitat, nest height, and nest structure are described. Two eggs is the usual set, although a small percentage contained one egg and one three-egg set was found. Measurements are given. The period of incubation ranged from 15 to 20 days; young left the nest at various dates, according to locality, from the 13th to 20th day after hatching. The development of the young and care of the young by the parents are discussed; both parents assist in rearing the squabs. Food of the young and habits of the juveniles after leaving the nest are described, especially the habit of well grown white-wing squabs ranging alone, and begging food from mourning doves rather than feeding themselves. Comments are added on roosting and on voice."

Life Histories: Ground squirrel, Piute

Alcorn, J. R. Life history notes on the Piute ground squirrel, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(2), May 1940, pp. 160-170, 1 fig., 3 tables.

Citellus townsendi mollis in Nevada. Notes on its use for food by the Indians, by whom its distribution possibly has been extended. Life history features treated are hibernation and aestivation, reproduction and fluctuation in numbers, activity of young, family and individual relations, swimming and climbing, burrows, food, enemies, and local migrations.

Life Histories: Grouse, Sage

Anon. The strutting sage grouse, Wyoming Wild Life (Wyoming Game and Fish Commission, Cheyenne), 5(6), June 1940, pp. 10-11, 3 photos.

Description and photographs of mating performance.

Life Histories: Mammals, Small

Burt, William H. Territorial behavior and populations of some small mammals in southern Michigan, University of Michigan, Museum of Zoology, Misc. Publ. 45 (Univ. of Michigan Press, Ann Arbor. 50 cents a copy), 58 pp., 2 pls., 8 figs., 12 tables, May 1940.

Report on a live trapping study in Livingston County of 6 species, fullest for the wood mouse (Peromyscus l. noveboracensis). Materials and methods and their efficiencies are first discussed; the animals were marked by an ear-punching and toe-clipping system capable of giving thousands of numbers. The longer accounts of the wood mouse and chipmunk treat habitat preferences, breeding, sex ratio, home sites, food storage, sociability, activity, home range, territorial behavior, homing instinct, dispersal, populations, longevity, and mortality. Shorter chapters are devoted to the flying squirrel, short-tailed shrew, pine mouse, and lemming mouse. Population estimates are considerably lower than those made by certain previous investigators whose errors are pointed out. The phases of territoriality are given a summary discussion. Bibliography of 30 titles.

Life Histories: Mice, Meadow

Hamilton, W. J., Jr. Life and habits of field mice, Scientific Monthly (Lancaster, Pa. 50 cents a copy), 50(5), May 1940, pp. 425-434, 10 figs.

Popular account of Microtus; under habits the author restates his finding that an individual may spend its entire life "on a plot not greater than a tenth of an acre." In feeding the animals take almost any vegetable and some animal materials. The animals may consume their own weight of green food in a day, and 100 mice to the acre might consume 300 pounds of a forage crop in a season. Population varies widely in a four-year cycle and at its peak may number from 200-300 mice per acre. Diseases and parasites appear to be the controlling agents. Mouse plagues and mouse predators are discussed, and the availability of meadow mice as objects of research is pointed out.

Life Histories: Otter, Sea

Murie, Olaus J. Notes on the sea otter, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(2), May 1940, pp. 119-131, 3 pls., 2 figs., 3 tables.

Report on studies in Alaska and California, especially full with respect to food habits. Sea urchins are by far the most important article of diet. The use of a stone as an anvil on which to break hard shellfish is described and illustrated. Breeding, care and habits of the young, herding, and hauling out are discussed. The sea otter does not feel at home on land and seldom goes there; its mode of walking is described and its tracks illustrated. Population recovery seems to be general and "with protection, these animals should become as abundant as in the past." The "Early life of a sea otter pup" is described by Edna M. Fisher in the succeeding article, pp. 134-137, 2 pls.

Life Histories: Starling

Allard, H. A. The starling's family life and behaviors, Journ. Washington Acad. Sci. (H. G. Ayers, Coast and Geodetic Survey, Washington, D. C. 50 cents a copy), 30(1), Jan. 1940, pp. 34-46, 4 figs.

Account of behavior as seen in a specially constructed observation nest-box: nest-building, incubation and brooding, feeding the young, nest sanitation, and making the bed. Reactions to extraneous material introduced into the box and social relationships also are described. Graphs show the time of arrival of starlings at Lyon Park, Va., in relation to dawn and of departure in relation to sundown. A general discussion of the observations concludes the paper, the final paragraph of which is here quoted: "A study of the starlings' behavior and family life indicates a very high order of bird intelligence throughout and a close attention to all phases of the family welfare. It is evident that the intimate understanding and cooperation of the two parents in all the stages of preparation for and the care of the family have helped to make the starlings highly adaptive and successful birds wherever conditions are favorable for their survival."

Life Histories: Walrus, Pacific

Collins, Grenold. Habits of the Pacific walrus (Odobenus divergens), Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(2), May 1940, pp. 138-144, 1 table.

Range and migratory movements, breeding, habits, and enemies. The animal is described, its present abundance, and hunting and utilization are discussed. The annual kill is about 1,300 but belief is expressed that the species "is now holding its own and is in no present danger of extinction."

Management: Attracting birds

Murphy, Robert Cushman. How to attract and study birds, Compton's Pictured Encyclopedia, 1940, pp. 141-146, 9 illus.

Suggestions as to feeding stations and devices, nest building and bird houses, planting trees, shrubs, and vines, and as to bird study. There is a section also on protecting and conserving birds which discusses predatory animals and the balance of nature, Indians and the balance of nature, misuse of resources, the "inexhaustible" game supply of early days, birds that have vanished or dwindled, dangers of drainage, and the conservation movement.

Management: Beaver

Shawver, Rowe. Brainy builder beaver, Western Sportsman (1009 Seventeenth St., Denver, Colo. 15 cents a copy), 5(3), Aug. 1940, pp. 6-10, 40, numerous photographs.

In 1887 when an estimated thousand beavers were all that survived in Colorado, the species was given protection that has continued to the present. In these 53 years, its numbers have increased to between 80,000 and 85,000. Beavers are now systematically trapped where troublesome and moved to other areas where they will be useful. Trapping and transporting methods are described and illustrated; the animals are placed 2 to 8 in a colony. They have proved useful in making pools in trout streams, in conserving water that could be used for irrigation, and in controlling erosion. Notes on habits of the animals and on their introduction to areas other than Colorado also are given.

An accompanying note by Clifford C. Spencer records in text and photographs the interesting fact that young beavers ride on the tail of the parent.

Management: Big game

Shantz, H. L. Necessary concepts in big game management, The Utah Juniper (Utah Agr. College, School of Forestry, Logan), 11, 1940, pp. 5-7.

"Maintenance of a varied and luxuriant vegetation is probably the best means of insuring a rich soil" of which wildlife is a product. "The first great essential in big game management is to see that food is available through out the whole year" in relatively fixed ranges. Where food is insufficient, herds must be controlled; probably the most effective method is killing enough of all age and sex classes. Hunting that selectively removes the best animals should not be permitted. The public must be educated to the needs and objectives of wildlife management. Wildlife is a crop to be used and enjoyed and "must be properly managed by men trained to see the many inter-relations of plants, animals, soils, and human uses."

Management: Big game

Shantz, H. L. How best to manage herds of big game, U. S. Forest Service (Missoula, Mont.), 7 pp., mimeographed, 1940.

Good management of wildlife depends upon rational behavior of the specia groups of people interested. Damage to range must be recognized and corrective steps taken before it is too late. Decision as to what must be done should be

left to men technically trained in this field, not assumed by essential amateurs as so often is the case. The history of big game herds under national forest management and of adjustment of grazing interests are traced. As a rule game cannot be moved; its numbers must be controlled locally in conformity with carrying capacity of the range. Methods of control are discussed along the lines of the paper involved in the preceding abstract. Prompt recognition of over-use of forage is important but it is a job for experts. The objectives of the Forest Service in wildlife management are stated (as summarized in WILDLIFE REVIEW No. 27, May 1940, p. 23) and discussed. National forest land, grazing land, and private land all must be embraced in balanced programs. Conservation alone results in overpopulations of some animals and proper use must be maintained. At the present time, only about a third of the deer crop is harvested by hunters, and better utilization should be obtained. Cooperation of interested groups is essential to success.

Management: Cottontail

Hickie, Paul. Cottontails in Michigan, Michigan Dept. of Conservation (Lansing), 112 pp., many figs., 6 charts, 9 tables, 1940.

Originally scarce and restricted in distribution, the cottontail, coincident with clearing of the country, increased and spread until at present it is the most important native game species of which more than 2,000,000 individuals are bagged by hunters annually. This bulletin is a compilation of previously recorded and of original information on the life history, population fluctuations, mortality from various causes including parasites and diseases (Chapter by S. C. Whitlock), harvesting, and management of the cottontail. Forty-six titles of literature cited are given besides a special reference list of food habit studies of predators (39 entries). A comprehensive and informative publication, the nearest to a cottontail management monograph that has yet appeared.

Management: Cover

Emerson, John L. The relation of Nebraska shelterbelt plantings to the State's wildlife, Nebraska Bird Review (1410 North 37th St., Lincoln, Nebr. 50 cents a copy), 8(1), Jan-June 1940, p. 30.

"On 46 shelterbelts in the Neligh, Kearney, Alliance, and Columbus, Nebraska, planting areas it was estimated that 936 Ring-necked Common Pheasants, 228 Prairie Sharp-tailed Grouse, 55 Greater Prairie Chickens, 67 Bobwhite Quails, 13 Chukar Partridges, and several hundred small insectivorous birds were using the plantings for cover and food. This estimate is based on the number of birds seen in approximately one per cent of the shelterbelts which have been planted in the state during the past five years. Consequently, when even a weighted average number of birds per planting is applied to the total of 2,526 miles, or approximately 5,000 individual plantings, which are established in Nebraska, an astonishing figure results. In all districts there are many indications that all types of wildlife are making increased use of the plantings, as the trees grow older and attain greater size. Badgers, coyotes, and foxes are moving into the belts. Large well-packed trails made in the snow by

pheasants and rabbits in nearly every planting of any size are definite indicators that the belts are used extensively."

Another article by Carroll F. Orendurff discussing in general terms "The relation of the farm shelterbelt to wildlife" is on pp. 1-4 of the same magazine.

Management: Estimating deer browse

Anon. White cedar for deer food, Lake States Forest Expt. Sta. (University Farm, St. Paul, Minn.) Technical Notes, 159, 1 p. (processed), May 1940.

Pounds of browse produced by the growth up to 7 feet above ground and by the entire tree of d.b.h. classes 1/4-12".

Management: Farm game

Bellrose, Frank C., Jr. Quail and pheasant studies in an orchard county, Illinois Natural History Survey (Urbana) Biol. Notes, 13, May 1940, 11 pp., 2 tables, mimeographed.

Calhoun County; ecology briefed; nesting in various sites and nest losses; both species were least successful in alfalfa fields and most successful in orchards; management suggestions are made.

Management: Farm wildlife

Edminster, Frank C. Is wildlife management worth while to the farmer?, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(3), June 1940, pp. 6-7, 29, 6 photos.

Reviewing the possible direct and indirect, tangible and intangible, values, the author concludes that "On the basis of the various economic values connected with wildlife, it is clear that wildlife management is seldom justified for the individual farmer on the basis of direct cash values. Even if other tangible values are included such as food obtained from game and business values, it is still doubtful if the average farmer can become very enthusiastic about expending time and money for wildlife benefits. It is thus clear that if wildlife management is confined to game management, the farmer will not ordinarily go very far out of his way to install recommended practices. However, if the farmer is encouraged to carry out wildlife management measures in order that he may reap the great variety of benefits which result from wildlife, his sincere attention can be attracted. Insect and rodent control certainly warrant much consideration on the part of the farmer. If his problems of artificial control can be lessened by biological controls, this means a saving to him of both time and money. It is also essential for every farmer to appreciate the conservation benefits that come with proper land management for wildlife. In addition to this, it is highly desirable that he participate in the social and business values although this may not be essential to attaining his interest."

On the other hand measures distinctly valuable in the maintenance of farm productiveness are beneficial to wildlife and it is in this secondary role that arguments for taking wildlife into consideration can be most logically advanced.

Management: Fur animals

Lay, Dan W. Management of fur-bearing animals on Texas farms and ranches, Texas Game, Fish, and Oyster Commission (Austin) Bul. 19, 8 pp., 1940.

Furs should be treated as a crop, the stock inventoried and production raised by attention to the food supply of fur bearers, protecting the animals, and increasing the number of dens for them. Suggestions are given as to the accomplishment of these ends, as well as on harvesting the fur crop. Bibliography of 9 titles.

Management: Game cooperative

Leopold, Aldo. History of the Riley Game Cooperative, 1931-1939, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(3), July 1940, pp. 291-302, 2 figs., 1 table.

Author's abstract: "Summary of a decade of experience in the improvement of food and cover for pheasants on eleven farms in southern Wisconsin. Corn is fed in winter and costs $25. Natural winter cover occurs on only one per cent of the area, but artificial plantings of conifers, mostly red pine, have added another one per cent. Such plantings become effective by their fifth year. Cover too thin for winter but usable at other seasons occurs on 17 per cent of the area. Roadside debrushing has so far decreased cover faster than plantings have increased it. The area was stocked with pheasants in 1931 and about 100 have been stocked annually since. Shooting began in 1932, and has yielded a steady increase in bag. The bag is now 75 pheasants yearly. Banding shows that the bag consists largely of wild pheasants; only 10 per cent are from pen-raised stock. Restocking is no longer profitable, and costs could be reduced from $1.40 to 50 cents per bird in bag by discontinuing it. However, the shooting preserve law compels its continuance. The mounting kill is ascribed to decreasing dispersion, which in turn results from greater population pressure outside the area. No predator control is practiced. The author believes that the successful creation of a good stand of birds proves it to be unnecessary."

Management: General

Leopold, Aldo. The state of the profession, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(3), July 1940, pp. 343-346.

Author's abstract: "This presidential address (Wildlife Society) reviews the status and trend of the profession of wildlife management. It contrasts science as an exercise of power with science as an exercise of wonder. It suggests that ecological drama is neglected as material for the fine arts. It laments the low proportion of private employment, and points out growing opportunity in land industries such as guano and furs. It reviews the defects of wildlife research, particularly the neglect of rodents and wild flowers, and urges more work on wildlife history. New alignments of extension and teaching are discussed. The author believes too many courses are for professionals and too few for the general under-graduate. The objective of the profession, once conceived to be the production of game, is now recognized to be the wholesale revision of land use."

Management: Herd regulation

Wallace, Frank. Keeping down the deer: a season's work in the forests, The Field (114 Fleet St., E.C. 4, London, England. 1 shilling a copy), 175(4562), June 1, 1940, pp. 846-847, 3 photos.

This report of the Deer Controller for Scotland deals with the red deer, a species more like our elk than like other American deer. The number of animals in Scotland is between 180,000 and 200,000. One head to 20 acres is all the average forest can carry, allowing a good margin for stock, sheep, hares, rabbits, etc. Carrying capacity is determined by the proportion of grazing below 2,000 or at most 2,500 feet. The ratio of stags shot to stag stock should be one in seven. As a war measure, hinds also are being killed. Estimated total numbers of the red deer and of the kill are given for the counties of Scotland. Proper disposition of the meat is discussed.

Management: Maryland Resettlement Project

Vaughn, Ernest A. The development of a wildlife restoration area on State forest lands in Worcester County, Maryland, Maryland Conservationist (514 Munsey Bldg., Baltimore, Md.), 17(2), Spring 1940, pp. 10-13, 25, 7 photos, 1 table.

Progress report on a project frequently referred to in WILDLIFE REVIEW, which may be consulted for a summary of the history of the project, a description of it, and an account of recent experiences with the wildlife, especially the bob-white, and with food patches. After rapid early increase, the bob-white population became comparatively stabilized at about 70 coveys on some 5,000 acres; the rabbit population also has remained more or less uniform from year to year. The article concludes with a series of answers to the questions that are most frequently asked about the project.

Management: Range

Beeson, R. W., et al. Handbook for range managers, Region 5, U. S. Forest Service (San Francisco, Calif.), 212 pp., 33 figs., photos, 1940.

An attractive and well-prepared manual. The only mention of wildlife is in connection with beaver planting and control of rodents and predatory animals (pp. 183-184). Bears, mountain lions, and coyotes are specifically mentioned. From the account of the latter, the following is quoted: "While coyotes will occasionally kill young calves, the problem involves largely sheep and game animals. Losses of sheep are heaviest on lambing ranges but are often important on the summer range. On important game areas sheep losses drop off at the beginning of the fawning season. The job of the range manager is to secure data on the losses from this cause, study the local problem, and recommend to his supervisor the action needed. He must not lose sight of the fact that the coyote is an important factor in wild animal populations and his complete removal may have violent repercussions. He may have minor effect on small, rapid-breeding animals such as ground squirrels, but generally the effect of his absence on deer herds is more marked. In several areas in the West, the control of the coyote has been a major factor in deer herds increasing out of all bounds, resulting in a necessity for reduction in livestock numbers, damage on crop lands, and even severe competition with domestic livestock on ranches."

Management: Soil conservation in relation to wildlife

Jenkins, Hal. Conservation farming benefits our wildlife, Outdoor America (1167 Merchandise Mart, Chicago, Ill. 10 cents a copy), 5(7-8), May-June, 1940, pp. 4-5, 2 photos.

Discussion of the effect of soil conservation practices in increasing wildlife, based in part on the Dambach and Good article abstracted in WILDLIFE REVIEW, No. 26, Feb. 1940, pp. 30-31. Changes from cropland to meadow and protected woodland are especially beneficial. Planting of a 3-acre eroded area in Kentucky to black locust resulted the second year in the building of 23 birds' nests where previously there had been none. Soil Conservation Districts now number more than 200 and involve 120 million acres.

Management: Songbird

McAtee, W. L. An experiment in songbird management, The Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 57(3), July 1940, pp. 333-348.

Author's summary: "A bird-attraction project carried on for six years in Prince Georges County, Maryland, had for its primary objective increasing bird enemies of chestnut weevils. A threefold to fourfold increase in the bird population was easily attained but the nut weevils were not perceptibly reduced in numbers; their increase, however, may have been checked. Entomological and management results have been published in eight papers that are cited. This communication is devoted to the more strictly ornithological findings, including analyses of nest-building materials and of food remains found in the nests; and tabulations of the proportions of complete and incomplete nests, size of clutches and length of laying seasons, serial nestings in single boxes, nesting success, and nesting losses. The history of a Purple Martin colony also is briefly sketched." Bibliography of 8 publications on the project, one of which was abstracted in WILDLIFE REVIEW, No. 26, Feb. 1940, pp. 37-38.

Management: Stocking, cottontail

Cramer, Wilbur M. Pennsylvania's rabbit transfer program, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(2), May 1940, pp. 6-7, 31, 2 photos.

Account of transfer from overpopulated to underpopulated areas, giving numbers of animals moved each season since 1933-34 (30,000 in 1939-40), N.Y.A., and sportsman cooperation, and costs. Some pheasants, squirrels, and raccoons also were handled. The author believes that "The rabbit trapping program is a part of good game management. It enables us to harvest a crop of game from areas where no hunting is permitted. Thus, an otherwise idle source of supply is wisely utilized. It enables us to secure the advantage of restocking game that normally would be at least partially destroyed by stray dogs and cats and other predators common to built up sections. This rabbit trapping relieves damage situations in nurseries and in orchards, as well as near gardens and truck patches. It also is aiding the Game Commission to build up a local rabbit supply that will help us to be self-supporting when the exportation of rabbits from other states is no longer possible."

Management: Stocking, partridge, chukar

[Nagel, Werner O., and Rudolf Bennitt]. The chukar partridge, Missouri Conservationist (Missouri Conservation Commission, Jefferson City), 2(4), May 1940, pp. 2, 7, 3 figs.

Of 86 species and subspecies of birds introduced into the United States, only 5 are widely established. Difficulties and objections connected with introductions are discussed. Stocking propagated birds for public shooting is "impossibly expensive" so introduced species must be put on the same basis of natural reproduction as are the natives. The introduction of chukars into Missouri received much more ecological guidance than is customary in such attempts, but "no area has yet been found in Missouri in which it appears that chukars will set up a stable, general, and self-supporting population."

Management: Wildlife, Texas

Taylor, Walter P. Texas should lead in game, The Cattleman (Fort Worth, Texas), 27(1), June 1940, pp. 47, 48, 49, 3 photos.

Advantages connected with its great extent, and good fortune in the preservation of remnants, at least, of a great variety of game species, give Texas opportunity to lead the nation in wildlife productivity and in associated economic values. To achieve that end the State should also lead in game research, should emphasize the place of wildlife in the land use program, should revise the game and fish laws and provide for their better enforcement, develop farmer-sportsman cooperation, and improve conservation education.

Management: Wildlife, Utah

Woodbury, Angus M. Planning for the conservation of Utah's wild life, Utah Educational Review (316 Beneficial Life Bldg., Salt Lake City, Utah), 30(4), Jan-Feb., 1937, pp. 173-174, 200.

All land use affects the fauna and flora and "If we are to have a reasonable balance between the economic, esthetic, and scientific needs it is imperative that special groups shall not have a dominant voice." Classification of Utah lands as to ecological types and notes on the agencies controlling and managing them. Comment on control operations and their probable effects. The author believes that natural conditions should be maintained with as little interference as possible. "The goal is the maximum production of desirable species." He makes suggestions for the management of the wildlife of a hypothetical tract of Utah mountain land. Bibliography of 6 titles.

Management: Wildlife, Utah

Woodbury, Angus M. Management of aquatic wildlife in the Great Basin, Scientific Monthly (Lancaster, Pa. 50 cents a copy), April 1940, pp. 307-322, 1 map, 17 photos.

Ecological conditions, both natural and artificial, affecting aquatic life; account of management including in our province the Biological Survey refuge on the Bear River marshes, especially in relation to wild fowl foods and diseases; note on State combined restoration and public shooting projects; beaver transplanting; mosquito control operations in relation to wildlife; and protection of fish-eating birds.

Management: Wildlife on recreational areas

Cahalane, Victor H. Some relationships of wildlife to the field of recreation, The Utah Juniper (Utah Agr. College, School of Forestry, Logan), 11, 1940, pp. 8-10.

Even in the presence of the greatest natural spectacles, no one is so absorbed as not to be interested in animal life. Human interest is not long sustained where wildlife is lacking. Wildlife is the basis not only of esthetic enjoyment but of sport. Fishing may be permitted in recreational reservations because fishes "can be replaced with facility and comparatively slight expense. Game birds and mammals are not so readily replaced so their hunting is much more sharply limited." Hunting is prohibited on all national parks and monuments and on most State parks. Nevertheless, wildlife there serves recreational uses and over and over again as it is not destroyed. Reservations kept in a natural state are favorable places to study wildlife not only as an end in itself but also in preparation for management. Difficulties arise in wildlife reservations chiefly through human contacts with the fauna. Management then requires regulation of the activities of people often for their own protection. "If wildlife and human use are to be combined successfully on recreational areas, the major essential is cooperation of all the technical men concerned."

Management: Winter feeding

Morton, James N. What Johnny Appleseed did for wildlife, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(4), July 1940, pp. 6-7, 4 figs.

Value of cull apples and of pomace from cider mills in winter feeding.

Natural History: Aquatic plants

Fassett, Norman C. A manual of aquatic plants (McGraw-Hill Book Co., 330 West 42nd St., New York, N. Y. $4.00 a copy), vii+382 pp., copiously illustrated, 1940.

The intent of the author was to provide keys and "illustrations for macroscopic plants which normally grow in water (saline, tidal, and bog habitats excluded) from Minnesota to Missouri and eastward to the Atlantic. Part I is a key based on vegetative characters for identifying aquatic plants. Part II gives a taxonomic treatment of all the plants. A feature of the book is the key to sterile plants." The author adds that "the text is essentially a set of directions for looking at the pictures." The work throughout shows the impress of Dr. Fassett's thoroughness; in the very essential factor of illustrations (the best yet made of American aquatics), he has had the assistance of a number of individuals, some of whom worked "in large part without recompense." The book should be highly useful to all who work with aquatic plants in wildlife management in the region covered. Besides direct utility it has the merit of a guide to recent supplementary literature which is cited and briefly abstracted in connection with the sections concerned. In the appendix are found a chapter on the use of aquatic plants by birds and mammals with a special index, and another on the relation of plants to fishes (each accompanied by a bibliography), and a glossary of technical terms. There is also a full general index. An excellent book which could usefully be extended to cover the entire United States.

Natural History: Birds of eastern North America

Forbush, Edward H., and John B. May. Natural history of the birds of eastern and central North America (Houghton Mifflin Co., Boston, Mass. $5.00 a copy), xxvi+554 pp., 97 colored pls., 1939.

Material and illustrations from Forbush's well-known "Birds of Massachusetts and other New England States" revised, abridged, and supplemented by accounts of more than 100 species and additional colored plates by Brooks and Peterson. Forbush's work, one of the best if not the very best of the State ornithologies, went out of print but its values could ill be spared. They are salvaged here so far as limitations of space permit and the book made applicable to a considerably enlarged region. The plates, conveniently bound together at the end of the volume, are well reproduced and clearly titled.

Natural History: Birds of Kentucky

Wetmore, Alexander. Notes on the birds of Kentucky, Proc. U. S. National Museum (Washington, D. C.), 38(3069), pp. 529-574, 1940.

Report on specimens in the National Museum mostly collected in 1938 in special preparation for this list which does not compile references in the literature. Notes on 167 species and subspecies.

Natural History: Birds of Maine

Aldous, C. M., and H. L. Mendall. Game birds of Maine, University of Maine, College of Agriculture (Orono) Extension Bul. 275, 38 pp., frontispiece and 12 other photos, March 1940.

Treatment of 11 breeding species of game birds, giving for each status and life history notes and management suggestions; there is briefer comment upon 6 groups of migrants and a bibliography of 10 titles.

Natural History: Birds of Michigan

Wing, Leonard. Birds of the upper peninsula of Michigan, State College of Washington (Pullman) Research Studies, 7(4), Dec. 1939, pp. 163-198, 1 map, 8 tables.

Brief descriptions of localities worked; tabulations of frequency of occurrence, and relative abundance of birds both in summer and winter; and annotated list of 131 species.

Natural History: Birds of New York

Hyde, A. Sidney. The ecology and economics of the birds along the northern boundary of New York State, Roosevelt Wildlife Bul. (State College of Forestry, Syracuse, N. Y.), 7(2), Oct. 1939 (June 1940), pp. 62-215, figs. 26-57, tables 7-11, 2 maps.

Climate and ecology of the region, description of 8 types of habitats with lists of their characteristic birds; field observation on birds swarming to feed on green maple worms, and notes on destructive birds (starling, robin, pheasant); annotated list of summer birds; bibliography of 2-1/2 pages.

Natural History: Birds of Ohio

Trautman, Milton B. The birds of Buckeye Lake, Ohio, University of Michigan, Museum of Zoology (Ann Arbor. $2.50 a copy) Misc. Publ. 44, 466 pp., 16 pls., 9 tables, 2 maps, May 1940.

A very comprehensive local report based on 12 years' observations by the author and considerable cooperation which is fully acknowledged. The area treated covers about 44 square miles. Its history and all features of its ecology are exhaustively discussed. General conclusions as to the avifauna and

systematic accounts of the occurrence and migrations of 283 species and subspecies make up the bulk of the volume. The work has a bibliography and an index, both ample. It presents the results of thorough study in excellent form.

Natural History: Birds of Oregon

Gabrielson, Ira N., and Stanley G. Jewett. Birds of Oregon (O.S.C. Cooperative Assoc., Oregon State College, Corvallis. $5.00 a copy), xxx+650 pp., 97 plates (1 col.), 30 figs., 2 tables, 1 folding map, April 1940.

The authors of this work had a combined total of 50 years' experience in Oregon up to 1935. Both are enthusiastic field ornithologists who gave freely of their time, energies, and funds in order to improve knowledge of the birds of Oregon; particularly noteworthy were their arduous efforts to study the sea birds. So far as possible, published information on the Oregon avifauna has been compiled; besides matter distributed through the volume, this effort has resulted in a 13-page chapter on "History of Oregon ornithology," a 35-unit "List of birds originally described from Oregon," and a 30-page bibliography. General chapters present "Something about birds as a group," and treat "Topography and life zones of Oregon," and "Federal bird refuges in Oregon." In the annotated list of species and subspecies (536 pages), characters and general distribution are briefly stated in each case; the history of knowledge of each form in the State is recorded, its habits are described, and whenever possible information on local food habits given. Birds recorded from Oregon on insufficient evidence are discussed in a hypothetical list, and these (35 forms) as well as the admitted species and subspecies (428) are also tabulated in check-lists. The volume has a satisfactory index. A good book by the men best qualified to prepare it.

Natural History: Birds of Pennsylvania

Todd, W. E. Clyde. Birds of western Pennsylvania (University of Pittsburgh Press, Pittsburgh, Pa. $5.00 a copy), xv+710 pp., 23 pls. (22 col.), 1 inserted topographic map, numerous distribution maps and pen and ink sketches of birds, June 1940.

The author is to be congratulated on the highly satisfactory form in which his life-long study is now presented. It treats more than 300 species and subspecies of birds of which 118 "hard for the amateur observer to identify in the field" are illustrated in color from paintings by George M. Sutton. The specific accounts typically include a description, sections on range, migration, and habits, and a synopsis of published records. The introduction deals with geography and physiography of the region, ecological conditions, climate (including a critical discussion of the life-zone concept), comments on the present status of bird life, and gives a historical review of western Pennsylvania ornithology and a record of the field work on which the book is based. The work includes also a gazetteer, a more than 20-page bibliography, and an index of bird names.

Natural History: Birds and mammals of Canada

Clarke, C. H. D. A biological investigation of the Thelon Game Sanctuary, National Museum of Canada (Ottawa), Bul. 96, 135 pp., 25 photos, 3 maps, 2 tables, 1940 (50 cents a copy).

This large sanctuary established primarily to guard the musk ox from extinction, harbors also the barren ground bear and the barren ground caribou, as well as a great variety of other subarctic life. This report gives the history of the sanctuary and of the region, including effects of the human population upon wildlife. Physiography, vegetation, and climate of the area are discussed and the fauna dealt with in annotated lists of mammals, birds, and fishes. The fur production for the period 1928-37 is tabulated. Cycles and diseases are discussed, especially in relation to fur and game animals. The musk ox and the caribou are the subject also of longer special essays giving information on their numbers, ranges, movements, and the factors influencing their populations. Bibliography of 200 titles.

Natural History: Herpetology of New Hampshire

Oliver, James A., and Joseph R. Bailey. Amphibians and reptiles of New Hampshire, New Hampshire Fish and Game Dept. (Concord) Survey Report No. 4, Biological Survey of the Connecticut Watershed, 1939, pp. 195-221, 2 pls.

Annotated list of 37 species with keys to adults by the authors cited, and a key to amphibian larvae of the State by Grace Orton.

Natural History: Mammals of Nova Scotia

Smith, Ronald W. The land mammals of Nova Scotia, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 24(1), July 1940, pp. 213-241.

History of knowledge of mammals of Nova Scotia; physiography and ecology of the Province; annotated list of 45 forms of land mammals of which 2 subspecies are described as new; the individual accounts include, so far as practicable, synonymy, statement of distribution, descriptive notes, measurements, remarks, and records of occurrence.

Natural History: Whales

Denmead, Talbott, and Esther E. Dodd. [Leaflets on whales] U. S. Bureau of Fisheries (Washington, D. C.). Whales I-52, 10 pp., 2 tables, mimeographed, May 1940. Whales-2, 30 pp., 21 tables, mimeographed.

The first of these leaflets gives general information about the distribution, habits, and enemies of whales, tells of their commercial products, and gives a history of the whale fishery and of conservation measures. It lists briefly the characteristics of 13 species of cetaceans and includes a bibliography of 21 titles.

The second publication cited is devoted to historical matters and especially to statistics as to the extent of the industry and the catch of usonian firms from 1937 to 1940.

Predation: Prey availability

Wooster, L. D. An ecological evaluation of predatees on a mixed prairie area in western Kansas, Trans. Kans. Acad. Sci. (Topeka), 42, 1939 (1940), pp. 515-517, 2 photos, 1 table.

Continuation of the author's work on the quantitative relations among animals of the prairie (last noticed in WILDLIFE REVIEW, No. 21, May 1939, p. 19). By applying the formula: number (per square mile) X weight (grams) X time available, the author reaches an ecological valuation of prey species. The hares and rabbits are far in the lead, with meadow mice, ground squirrels, and white-footed mice next in rank. The word "predatee" seems unnecessary as it conveys nothing not covered by the simpler and familiar term "prey."

Predation: Vermin problem

Rhoades, R. This predator called man, Ohio Conservation Bul. (132-134 N. Washington St., Greenfield, Ohio. 10 cents a copy), June 1940, pp. 18-20, 3 figs. (cartoons).

Popular discussion of the reasons for dwindling of wildlife and of the vermin problem. The author suggests improvement in cover for all sorts of wildlife as an offset for man's destructive influence.

Propagation: Bob-white

Gaither, Edwin H. Quail hatching in an eggshell, Outdoor Georgia (412 State Capitol, Atlanta, Ga. 15 cents a copy), 1(1), May 1940, pp. 23, 32, 1 photo.

Average number of eggs in the wild, 13; in captivity, 60; maxima from 120-130. Suggestions on care of breeding stock and directions for incubating eggs both by bantams and by incubators.

Propagation: Hybrids

Danforth, C. H., and Gunnar Sandnes. Behavior of genes in inter-generic crosses, Journ. Heredity (32nd St. and Elm Ave., Baltimore, Md. 35 cents a copy), 30(12), Dec. 1939, pp. 537-542, figs. 11-13.

Brought to attention not for its bearing on heredity but for the convenience of those who must answer questions as to whether pheasant-chicken and other inter-generic crosses are possible. The hybrids treated in this paper are Phasianus X Gallus, Phasianus X Syrmaticus, Phasianus X Chrysolopus. Bibliography of 10 titles.

Propagation: Hybrids

Pratt, Jerome J. Hybridization, 1939 yearbook of the American Pheasant Society [p. 12, 3 photos] in Modern Game Breeding (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa. 25 cents a copy), 10(4), April 1940.

Phasianus X Gallus and Chrysolophus X Gallus hybrids described and illustrated.

Propagation: Partridge, Chukar

[Reck, J. P., and B. A. Barger]. Breeding and rearing of chukar partridge, North Dakota Outdoors (State Game and Fish Dept., Bismarck, N. Dak. 5 cents a copy), 2(11), May 1940, pp. 13-15, 3 photos.

Based on experience in North Dakota and Wisconsin, notes are given on identification of the sexes, on penning and caring for breeding birds, feeding of chicks, and controlling diseases.

Propagation: Turkey, Wild, standards

Sibley, C. L. Standard for northeastern wild turkey, Modern Game Breeding (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa. 25 cents a copy), 10(5), May 1940, pp. 4-5.

General remarks on the turkey and on its wildness; standards based on the wild strain detailed as to shape, color, and weight for the sexes.

Propagation: Trapping

Benton, Lawrence D. A handy game bird trap, 1939 Yearbook of the American Pheasant Society [p. 13, 3 figs.] in Modern Game Breeding (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa. 25 cents a copy), 10(4), April 1940.

Description, illustrations, and bill of materials for a wood and wire notting continuous-acting trap.

Research: Cooperative

Rasmusson, D. I. Utah's Wildlife Research Unit, its program and objectives, The Utah Juniper (Utah Agr. College, School of Forestry, Logan), 11, 1940, pp. 17-20.

Background and history of the Unit; its research program sketched under 6 heads: life history and management studies of mule deer, sage grouse, and sharp-tailed grouse, waterfowl food plants, beaver survey, and miscellaneous. The place of personnel training in the Unit's program is explained and plans for future work outlined. Bibliography of 10 titles.

Research: Manpower in

Kalmbach, E. R. Manpower in wildlife research, The Utah Juniper (Utah Agr. College, School of Forestry, Logan), 11, 1940, pp. 14-16.

National work programs have made available greater manpower than has previously been obtainable for many lines of work including wildlife research. The more extensive data obtained has greatly improved the findings. Reference is made to the censusing of herds, checking upon hunting activities, and studies of the nesting success of waterfowl. Details are given of the latter work (in the anthor's special field) relative to the large numbers of nests studied on several Federal refuges. Work on the scale accomplished through CCC and other assistance would have been quite impossible for one or a few investigators. Fundamental ornithological data has been amassed in volume never previously equalled, improving enormously the background for management.

Research: Marking whales

Rayner, George W. Preliminary results of the marking of whales by the Discovery Committee, Nature (St. Martin's St., London, W.C. 2, England. 1 shilling a copy), 144(3659), pp. 999-1002, 7 charts, 1 table.

For several years whales have been marked by stainless steel tubes embedded in the blubber by being fired from a 12-bore gun. More than 5,000 animals have been marked. The percentage of returns is low, averaging less than 5 percent. The information throws some light, however, on the rate of kill and on movements which are mapped for 3 species;

Research: Trapping

Mac Lulich, D. A. Test of a method of small mammal trapping, Canadian Field-Naturalist (582 Mariposa Ave., Rockliffe Park, Ottawa, Canada. 25 cents a copy), 54(4), April 1940, pp. 57-58, 2 tables.

From author's summary: "(1) A plan of crowding break-back mouse traps 8 inches apart in rows spaced 1 foot apart on a rod square quadrat was tried in two successive years; (2) the method required too much labour and gave inadequate and irregular data. It is recommended that traps be spaced much farther apart on larger trapping areas."

Weights: Bobcat, Eastern

Hamilton, W. J. Weights of eastern bobcats, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(2), May 1940, p. 218.

Average of 74 was 15 pounds, 4 ounces; heaviest 36 pounds.

Weights: Pocket gophers

Smith, Clarence F. Weights of pocket gophers, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(2), May 1940, p. 220.

Thomomys f. fuscus from Montana; 49 adult males averaged 101.77 grams and 55 adult females 88.81 grams. Extreme and seasonal weights also are given.

ADDENDA

Bibliography: Lewis and Clark Expedition

Criswell, Elijah H. Lewis and Clark: Linguistic Pioneers, University of Missouri Studies (Columbia, Mo. $1.25 a copy), 15(2), April 1940 (rec'd August), cexi+102 pp.

This thorough analysis of the language of the journals kept by members of the Lewis and Clark Expedition is of great interest to naturalists. "Plants and animals occupy more space in the journals than any other subject." Not only are the references to organisms discussed by groups but they are also indexed by scientific names and formally annotated in a terminal lexicon. The work includes a bibliography of Lewis and Clark journals, of secondary sources of information on western explorations, and of works of reference used in the preparation of this very valuable concordance.

Food Habits: Shorebirds

Sperry, Charles C. Food habits of a group of shorebirds: Woodcock, snipe, knot, and dowitcher, U. S. Dept. of the Interior, Wildlife Research Bul. 1 (Supt. of Documents, Washington, D. C. 25 cents a copy), 36 pp., 3 col. pls., 7 tables, 1940.

A standard food habits report based on a total of 1,536 analyses of stomach contents. Sources of the material used for each species is indicated, the range and habits of the bird briefly outlined, and the food discussed in detail. Leading items of diet are for the: woodcock, earthworms (57%); Wilson's snipe, flies chiefly larvae (20%), and earthworms, crustaceans, and aquatic beetles, each 11%; knot, mollusks (59%); eastern dowitcher, insects (29%), marine worms (27%), and mollusks (20%); and long-billed dowitcher, midge larvae (41%). The tables present summaries of the food of each species by principal groups, and a record of frequency of occurrence of all items identified. A useful publication relating to a group, the food habits of which are all too little known.

WILDLIFE LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C.

BS-157. Sullys Hill National Game Preserve, North Dakota, 3 pp., 2 pls., April 1940.

This preserve has small exhibition herds of big game and also functions as a bird refuge. Its history since 1904 when first established is sketched and the historic features of the region are called to attention. A briefly annotated list of 12 other big game reservations is included.

BS-158. Original and present breeding ranges of certain game birds in the United States, by Robert C. McClanahan, 2 pp. mimeographed, and 37 maps multilithed, 21 pp. in all, April 1940.

One map shows the location of national wildlife refuges in the United States. The other 36 delineate the original and present ranges of as many species, and indicate the refuges of special value to them. Only the black duck shows natural extension of range, similar gains for 4 species of quails being due to transplanting.

BS-159. The chukar and Hungarian partridges in America, by Clarence Cottam, Arnold L. Nelson, and Lawrence W. Saylor, 6 pp., April 1940.

Notes on the introduction and present status of these two species, indexed by States. The chukar is reported succeeding in 7 States and the Hungarian partridge in 19.

BS-160. Wildlife in land planning, by W. L. McAtee, 6 pp., April 1940.

Slight revision of BS-71, Nov. 1936, which was abstracted in WILDLIFE REVIEW, No. 7, December 1936, p. 29.

BS-161. Wildlife technology, by W. L. McAtee, 5 pp., May 1940.

Slight revision of BS-67, Oct. 1936, which was abstracted in WILDLIFE REVIEW, No. 7, December 1936, p. 29.

BS-162. Birds as a factor in controlling insect depredations, by Clarence Cottam and Francis M. Uhler, 6 pp., May 1940.

Value of birds in the operation of natural balance; their achieving actual control of destructive insects is local; a number of recent instances are cited.

BS-163. Common salt as a curative for cannibalism among game birds in captivity, by Ralph B. Nestler, 2 pp., June 1940.

Addition of 2-3 percent of salt to the diet stopped toe-picking among adult bob-whites in 24 hours; 5-6 percent terminated fighting.

BS-165. The status of migratory game birds: 1939-40, 22 pp., June 1940.

Annual report on abundance of the birds according to the flyways and migrations, with special sections on the January inventory, on crippling and other indirect losses, natural enemies, and upon the woodcock, mourning dove, and 5 other migratory species treated as game. The ducks and geese as a whole are believed to have increased about 2-1/2-fold since 1935. "The mallard and pintail show the largest gains, that for the canvasback is considered satisfactory, but little change is detected in the status of the redhead. A slight decrease is recorded for the black duck. Canada geese also made a gratifying gain, although much of this was lost through excessive shooting. During January 1940 adverse weather conditions in the Southeast, coupled with legal hunting, made serious inroads into the numbers of woodcocks and mourning doves, with the result that the numerical strength of both species is much below that of 1939. Measures to restrict the kill during the forthcoming season are definitely indicated. The continued status of the white-winged dove as a game species is open to serious question, not only because of improper management in harvesting the crop but also of natural factors that endanger the stock. So far as can be determined, the status of the band-tailed pigeon and the Wilson's snipe is satisfactory for the present year, but both species must be watched to guard against undue depletion."

NOTES AND NEWS

By virtue of the President's Reorganization Plan No. III, the Bureau of Fisheries and the Bureau of Biological Survey were merged into the Fish and Wildlife Service effective June 2, 1940. This is the sixth designation under which the organization longest known as the Biological Survey has functioned. Dr. Ira N. Gabrielson, Chief of the Biological Survey, is the Director of the new Service and Charles E. Jackson, Acting Commissioner of Fisheries, and W. C. Henderson, Associate Chief of the Biological Survey, are Assistant Directors. Nearly 2,000 Federal workers in the United States and Alaska constitute the staff of the agency.

In the Dixie Ranger (U. S. Forest Service, Atlanta, Ga., 6(5), May 1940, pp. 1-2), the growth of wildlife management on national forests is commented upon and a tabulation given for the southeastern States which shows that 8,700,000 acres or about 20 percent of the total area of these forests is now being formally administered for wildlife management purposes.

The Sixth Annual Midwest Wildlife Conference will be held at Urbana, Ill., November 14-16, 1940. The program will include dedication of the Natural Resources Building on the University of Illinois campus, besides papers, exhibits, and field excursions. For information, address Dr. T. H. Frison, Illinois Natural History Survey, Urbana.

On July 10, 1940, a bronze plaque was erected in the State Capitol in memory of Dr. Joseph Kalbfus the first full-time secretary of the Pennsylvania Game Commission, a position he held for 21 years. The plaque, contributed by the sportsmen of the State, bears a bas-relief portrait of Dr. Kalbfus and text citing his record of courage, efficiency, and achievement.

An article on the "Influence of Unrestricted Grazing on Northern Salt Desert Plant Associationsin Western Utah," by George Stewart, W. P. Cottam, and Solar S. Hutchings, in the Journal of Agricultural Research (Supt. of Documents, Washington, D. C. 15 cents a copy), Vol. 60, No. 5, March 1, 1940, pp. 289-316, is of interest to wildlife managers having to do with grazing problems. The gist of the authors' conclusions is contained in the following quotation: "Impoverishment of desert forage, attributed by many to the drought of 1928-35, was not so markedly apparent after the drought of 1897-1904, which was of as long duration and, measured in total precipitation, more severe. The evidence gained from the study of these plant associations does not support the theory that drought is the sole or even the chief cause of present deterioration and depletion of the range. Instead, it points unmistakably to unrestricted grazing as the chief cause of loss of grazing values, invasion of inferior species, and the gradual crowding out of the most palatable range plants. The data show clearly that the heavy utilization of the forage by livestock must be relaxed in order to provide for restoration of the range to normal producing power and for its subsequent maintenance."

"Problems of Lake Biology" (Science Press, Lancaster, Pa., 142 pp., illus., 1939. $2.00 a copy) may be of interest to some wildlife managers. It puts in printed form a 9-paper symposium of the Limnological Society of America. Chapters probably of most utility to WILDLIFE REVIEW readers are those on rooted aquatic plants by L. R. Wilson (pp. 107-122, 11 figs.) and on "The position of fish and other higher animals in the economy of lakes" by F. E. J. Fry (pp. 132-142, 3 figs.).

Wildlife managers having to deal with Rocky Mountain trees will be interested to learn that a book of that title by Richard J. Preston has recently been published (i-lix+1-285+1xi-1xxxi pp., 125 pls., figs., 1940, Iowa State College Press, Ames, Iowa. $2.00 a copy, postpaid). The work includes an illustrated discussion of the characters used in identification of

trees and keys to the genera and species treated. It discusses life zones, names their characteristic trees, and gives check-lists of the trees of each of 9 States or parts of States covered. The running accounts describe all parts of each species, and note its silvical characters and habitat. For each widely distributed form, illustrations of diagnostic parts and a distribution map are given. There is also a glossary, a bibliography, and an index. The work seems eminently well done and should be useful.

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WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE FISH AND WILDLIFE SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

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Washington, D. C. No. 29 January, 1941

Classification: Birds

Wetmore, Alexander. A systematic classification of the birds of the world, Smithsonian Miscellaneous Collections (Smithsonian Institution, Washington, D. C.), 99(7), 11 pp., 1940.

Third edition of this check-list of families and superior groups used in the classification of birds, both fossil and recent.

Classification: Pocket gophers

Davis, Wm. B. Distribution and variation of pocket gophers (Genus Geomys) in the southwestern United States, Texas Agr. Expt. Sta. (College Station) Bul. 590, 38 pp., 6 figs., 4 tables, 1940.

A treatment of 4 species and 20 subspecies, ten of the latter being described as new. Keys and descriptions, statements of range and characteristics, and measurements, comparisons, and remarks, are included. Gophers of this genus live in sandy soils, and their races are more or less isolated by heavy soils and rivers, or by the two in combination. Bibliography of 8 titles.

Conservation:

Friedrich, George M. The study of conservation, Minnesota Depts. of Conservation and Education (St. Paul), 56 pp., 3 pls., 1940.

General discussion of conservation accompanied by teaching outline and bibliography in each part of which wildlife has its representation (pp. 23-26, 43-45, 54-55 (82 titles)). Interrelationships are emphasized throughout and the necessity of sound management indicated.

Conservation: Beaver

Highby, Paul R. The story of Minnesota beaver, Conservation Volunteer (Minnesota Dept. of Conservation, State Office Bldg., St. Paul), 1(3), Nov. 1940, pp. 41-46.

By the year 1900 beavers had been trapped almost to the vanishing point. Re-introduced in Itasca Park in 1901, the initial population of 3 (1 ♂, 2 ♀) had increased by 1907 by some 300 in the Park and had spread to other sections. In 1939 an open season was declared and more than 11,000 pelts were taken. The return to trappers was in excess of $120,000. Conservative management is all that is needed to retain the beaver as a continuing asset. The animals' habits are described, and the problems they cause by flooding areas man desires for other purposes, their relation to trout streams and flood control, and the good they do in creating ponds and meadows also are discussed.

Conservation: Bighorn

Rush, Wm. M. Bighorns need a break, Outdoor Life (353 Fourth Ave., New York, N. Y. 15 cents a copy), 85(1), Jan. 1940, pp. 38-40, 85, 6 photos.

Though protected over most of their range, bighorns continue to decrease; counts of the animals on National Forests showed about 14,000 in 1921 and less than 3,500 in 1938. Hunting, both legal and illegal, was a big factor in eliminating the animals from much of their original range. Golden eagles and bobcats prey upon the lambs, and diseases (pneumonia, scabies) have killed many adults. The sex ratio is unbalanced and selective killing of males is required to restore it. Notes on fighting and jumping. Management suggestions are made. No other wildlife problem in the United States is so urgent as the rehabilitation of the bighorn.

Conservation: Birds in Pan-America

International Committee for Bird Preservation. What is happening to birds in Pan-America, Revista de Agricultura Industria y Comercio de Puerto Rico (Departamento de Agri. y Com. San Juan), 32(3), Sept. 1940, pp. 461-462.

"In the aggregate, millions of individuals of 421 kinds of our United States birds depart in autumn to regions where the word 'conservation' is of little meaning. x x x Furthermore, we can never hope to rebuild to their natural level our supply of migratory wildfowl and shore-birds without the cooperation of the citizens of those Southern Countries where so many of these birds go for six months of every year. Protecting the birds of the Western World is clearly and profoundly an international problem. This movement is supported by friends of the cause who wish to aid in preserving our birds that know no national boundaries."

Conservation: General

Committee. Hearings before the Select Committee on Conservation of Wildlife Resources, House of Representatives, 76th Congress, Third Session, 1940, 429 pp., 1 folded map, tables. (Gov't. Printing Office, Wash., D.C.)

Report of hearings March-May, 1940 at which representatives of 22 State Game Commissions and of 13 Federal Bureaus, besides other organizations and individuals concerned described their achievements and presented their problems. Most of the sections include a record of questions asked by the Committee and of the replies by witnesses. There is so much detail in the report that it can scarcely be outlined here but the book should be consulted by all interested in current phases of wildlife conservation. Some of the included material of more permanent significance is the map of national forests and purchase areas, a descriptive list of Federal Game Refuges on national forests, and a report summarizing "An economic study of wildlife as a supplementary farm enterprise" (pp. 238-251). This is presented without the names of the men who did the work, J. Paul Miller of the Biological Survey and B. B. Powell

of the Bureau of Agricultural Economics, who visited every State in the Union in the course of a two-year investigation, June 1936 to June 1938. This presentation treats the history of the project, contains an outline of the contents of a voluminous manuscript report, and gives a summary of the findings, conclusions, and recommendations. Fuller publication is promised. The present report contains data that has never been available before, a great deal of which is compactly tabulated as to, "Land open to hunting, except as restricted by the property rights of private owners, per hunting license issued by states, 1935" (varies from 33, New Jersey, to nearly 12,000, Nevada); "Agricultural land in relation to potentially huntable land, by states, 1935" (the percentage of potentially huntable land that is devoted to agricultural uses varies from 17.8 in Florida to 99.8 in North Dakota); "estimated acreage providing food and cover for wildlife, by classes of land, 1935" (60.5 percent of the total land area of the United States); and "Estimated acreage on which it is considered economically feasible to improve food and cover for wildlife, by classes of land, 1935" (68.5 percent).

Quotation of a few paragraphs from the general conclusions will suffice to show that the findings of this investigation run greatly counter to some widely-held opinions.

"At the present time, especially on good farm land, there is little or no incentive for the farmer to use his resources in the propagation of game and other wildlife for public or semipublic utilization, because the users of wildlife not only fail to recompense him for his part in providing wildlife and the facilities for its enjoyment, but they also often inflict damage to livestock, fences, and other property. However, in some sections, especially where the land is poorly adapted to the production of agricultural crops, and where trespass is rigidly controlled, considerable opportunity exists for the farmer to increase his income by the production of wildlife for semipublic utilization.

"In general, farmers are penalized for having wildlife, because the more abundant the game or fur animals, the more damage they inflict and the greater the nuisance and damage inflicted by the hunter and trapper. As a result most game and fur animals on farms are there in spite of agricultural practices, or at best accidentally; whereas, if the farmer received proper recognition, he would in many instances produce wildlife as a byproduct incidental to such farm practices as woodlot management, erosion control, and soil and water conservation.

"The findings of the study indicate that if wildlife is to be perpetuated and enjoyed by the public, it must be produced by natural reproduction on private farm land as well as on publicly owned land, and its utilization must be strictly controlled. Pen propagation and stocking have proven expensive and inadequate as a direct means of providing game. Public owned land cannot supply enough wildlife or the facilities for its utilization by the public, and uncontrolled public utilization of wildlife on private farm land has proven destructive to farm property and to wildlife.

"Hunting and aesthetic uses of wildlife are luxuries in the same class as golfing, horseback riding, and going to the movies. It is no more unreason-

able to expect the wildlife user, particularly the hunter who actually consumes wildlife, to pay to the landowner and others the full cost of providing the facilities for his recreation than it is to expect the golfer, horseback rider, and movie goer to pay the full cost of providing the facilities for his respective recreation. Trapping is a business proposition to the trapper, and it is just as reasonable for the farmer or other landowner to receive remuneration for his part in providing fur animals and allowing others to use his land in taking them as it is for the owner of timberland to get remuneration for allowing others to take the timber. These conclusions seem reasonable because there is no denying the fact that the farmer or other landowner is put to expense in providing wildlife and in allowing others to use his land in utilizing wildlife."

Conservation: General

Committee. Conservation of wildlife. Report of the Select Committee on Conservation of Wildlife Resources, House of Representatives, 76th Congress, 3rd Session, House Report 3112 (Government Printing Office, Washington, D. C.), 64 pp., 1941.

The usual annual review of the accomplishments and problems of Federal agencies concerned: Fish and Wildlife Service, National Park Service, Forest Service, Soil Conservation Service, and Civilian Conservation Corps. There is also a symposium on "State versus Federal Control of Nonmigratory Game," contributed to by State and Federal officials, and Recommendations by the Committee.

Conservation: Hawks

Edge, Rosalie, and Ellsworth D. Lunley. Common hawks of North America, Emergency Conservation Committee (734 Lexington Ave., New York, N. Y.), 25 pp., illus., 1940.

The introduction by Ira N. Gabrielson, Director of the national Fish and Wildlife Service, should encourage teachers to regard this leaflet as a reliable guide to instruction about the birds concerned. Statements in it about prey of the various groups of hawks are based chiefly upon publications of the Biological Survey, forerunner of the Wildlife Service. The usefulness of bird-eating hawks is specially discussed, as are also methods used by man in reducing the numbers of the birds, and progress that has been made in protecting them. The leaflet includes questions for younger, and suggestions as to research by more advanced, students, and a bibliography of 29 titles.

Conservation: Pan American

Coolidge, Harold J., Jr. A new Pan American treaty, Science (Lancaster, Pa. 15 cents a copy), 92(2394), Nov. 15, 1940, pp. 458-460.

Discussion of the treaty noted on pp. 54-55 of this issue of WILDLIFE REVIEW.

Conservation: Waterfowl

Deck, Raymond S. No water in the nursery, Saturday Evening Post (Curtis Publishing Co., Philadelphia, Pa. 5 cents a copy), Nov. 16, 1940, pp. 22, 108-111, 2 photos.

Popular article. The drought in the Great Plains wild fowl nursery, although directly injurious, was indirectly beneficial to the birds in convincing the people that effective steps for conservation were necessary. Measures adopted both in the United States and Canada are described.

Conservation: Waterfowl

Lincoln, Frederick C. January duck shooting, Florida Game and Fish (Commission of Game and Fresh Water Fish, Tallahassee), 1(9), Nov. 1940, pp. 4-5, 12, 2 maps.

The maps show the great discrepancy in extent between available breedin and wintering ranges of waterfowl, and the text emphasizes the need for protec tion on the wintering areas. Any approach toward "spring shooting", with its destructive effect on the breeding stock, should be discouraged.

Conservation: Wisconsin

Leopold, Aldo. Wisconsin wildlife chronology, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 5(11), Nov. 1940, pp. 8-20.

The chronology of outstanding events 1822-1940, and more than 2-pages o bibliography are preceded by ecological discussion. It maintains that variety and quality of wildlife rather than quantity are modified by the impact of civilization, quantity being a manifestation of the productivity of the soil. The typical result is decrease of the more desirable, and increase of the less desirable, types. The extirpated and declining forms of Wisconsin wildlife and the invaders and substitutes are grouped and discussed. Conservation has proceeded through the stages of prohibitions, substitutions, reserving habitat for wildlife, management, and education.

Control: Ant, Fire

Travis, Bernard V. The present status of the methods of control for the fire ant, Cooperative Quail Study Association (Thomasville, Ga.), 9 pp. Nov. 1940.

Solenopsis geminata, in some areas, destroys as much as 15 percent of the quail hatch by eating the chicks in pipped eggs. Experiments in control have been carried on intermittently since 1931; they are described and summarized. In the present state of knowledge, poisoning in spring ant colonies within a radius of 50 feet of quail nests is the most practical thing to do. Poisoned baits and methods of applying them are described.

Control: Cat

Budlong, Robert R. The cat spanker, National Park Service Region III (Santa Fe, N. Mex.) Quarterly, 2(4), Oct. 1940, pp. 35-37, 1 pl.

This will appeal to those who want to discourage cats but not to kill them. The apparatus is pictured and described; having once passed through it, the cats are said never to return.

Control: Crow

Kalmbach, E. R., and S. E. Aldous. Winter banding of Oklahoma crows, Wilson Bul. (Gustav Swanson, University Farm, St. Paul, Minn. 60 cents a copy), 52(3), Sept. 1940, pp. 198-206, 1 fig., 1 table.

At various places and dates, 714 crows were banded; in 3-1/2 years, 143 returns have been received. The places of recovery of the bands are spotted on a map. Of 65 birds reported during the breeding and rearing season, 49 (75 percent) were killed in the prairie provinces of Canada but none in Oklahoma. Crow control, therefore, can have little effect on the breeding populations of game and other birds in that State. "Although winter Crow control in Oklahoma is destined to remove some birds that would enter the problem of Crow-waterfowl relationships in the Canadian provinces, the effect of this control is certain to be much 'diluted' if the results are to be judged in a continental perspective. This comes about because only a portion of the Crows nesting in Canada can be classed as duck-egg predators, and because the Crow, in what might be termed destructive abundance, occupies possibly only a sixth of the duck-nesting area of Canada and Alaska."

Control: Deer damage

Barrett, Paul M. The deer damage committee, Michigan Conservation (Michigan Dept. of Conservation, State Office Bldg., Lansing), 10(1), Nov. 1940, pp. 2, 10, 1 photo.

Deer damage to crops has been increasing during the past ten years. The Conservation Department, looked to for relief, appointed a committee, representing all interests, to consider the situation. After lengthy discussion, the committee was of the opinion that it would be necessary, while other forms of relief are being devised, to continue the issuance of shooting permits, although these are said to be "unsatisfactory to all concerned." The committee made field inspections and experimented with "deer-proof" fences and "buffer" feed strips, without reaching conclusive results. Its findings are presented in 12 paragraphs which state that paying for damage and maintaining artificial feeding are impracticable, suggest purchase of isolated farms where depredations are worst, recommend continued trapping and distribution of deer, urge further experimentation with control measures and improvement of natural food supplies, regulation of the deer herd in critical areas, and search for a type of agriculture that can be carried on satisfactorily in the presence of numerous deer.

Control: Fish-eating birds

Pough, Richard. Blue herons can't read, Bird-Lore (National Audubon Society, 1006 Fifth Ave., New York, N. Y. 30 cents a copy), 42(6), Nov.-Dec. 1940, pp. 507-516, 6 photos.

Investigations at fish hatcheries in 9 States revealed high destruction of fish-eating birds. Although the operations are supposed to be chiefly under permit, hatchery men frequently do not have permits, and of those who do comply with that formality, a considerable proportion do not render reports on the number of birds killed--an observance that is allegedly requisite to continued possession of the privilege. Laxness in enforcement of the regulations is criticized and the Federal government is urged to set an example to hatchery operators by screening its ponds.

Control: General

Fitzpatrick, Frederick L. The control of organisms (Teachers College, Columbia University, New York, N. Y. $2.75 a copy), xi+334 pp., illus., 1940.

Chapter xi (pp. 184-205) is devoted to rodent pests and chapter xv to other divisions of the native fauna. Inter-relations are emphasized and natural, given more attention than artificial, control. Treatment is generalized and condensed as necessary in a textbook. There are numerous footnote references and a terminal bibliography of 3 pages.

Control: Ground squirrel

Becker, E. M. An effective ground squirrel trap, California Dept. Agr. (Sacramento) Bul., 29(3), 1940, p. 152, 1 fig.

Box type killer trap described and illustrated.

Control: Ground squirrel

Becker, E. M. A three-year record of ground squirrel trapping, California Dept. Agr. (Sacramento) Bul., 29(3), 1940, pp. 153-156, 4 tables.

Tabulation of trapped animals with details as to pregnancy and number of embryos of females. The information and conclusions given are from the trapping of some 18,000 ground squirrels. The use of steel traps is less selective than poisoning or gassing, hence employing the box trap referred to in the preceding abstract is recommended. "Trapping is a slow and expensive method of squirrel control and is only justified in eradication work or where all other methods have failed."

Control: Policies

Anon. Information for the guidance of fieldmen and cooperators of the Fish and Wildlife Service engaged in the control of predatory animals and injurious rodents, U. S. Dept. of the Interior Wildlife Circular 5, (Supt. of Documents, Washington, D. C., 5 cents a copy), 8 pp., 1940.

Contents: Necessity for control of wild-animal pests, control functions of the Fish and Wildlife Service, legal authorization for control work, animals on the control program, and instructions regarding field practices.

Control: Rabbit, European

Lockley, R. M. Some experiments in rabbit control, Nature (MacMillan & Co., Ltd., St. Martin's St., London, W. C. 2, England. 1 shilling a copy), 145(3681), May 18, 1940, pp. 767-769.

Account of a 12-year attempt to control, and if possible, exterminate, European rabbits on a rocky island of about 250 acres. Steel traps were given up as inefficient and inhumane. Snares, nets, and wire-mesh traps could not be used in much of the difficult terrain and ferrets proved unsatisfactory. Disease, both of natural occurrence and introduced, passed on, leaving the population as numerous as ever. Fumigation with sulphur was found expensive and difficult to handle and produced a painful death. Cyanogas was more satisfactory and efficient. In three applications the kill is estimated to have reached 96 percent. Forage immediately increased so that 100 sheep brought to the island were unable to keep it down.

Control: Rodents

Cassady, John T., and George E. Glendening. Revegetating semi-desert range lands in the Southwest, Civilian Conservation Corps Forestry Publ. 8 (Supt. of Documents, Washington, D. C. 10 cents a copy), 22 pp., 11 figs., tables, 1940.

Directions for replanting areas deteriorated chiefly through overgrazing. Protection of seedings from livestock and rodents is necessary. The text relating to rodents is here quoted: "Rodents are often a definite limiting factor to successful artificial revegetation, particularly on sandy mesquite lands or other brushy lands that provide excellent escape cover and homesites for the rodents. Intensive control campaigns will be necessary on such areas prior to the revegetation work, followed by additional control if the rodent population becomes large before the plant cover is well established. On areas densely populated with rodents, shrubs that quickly outgrow the reach of rodents may be preferable to grass."

Control: Rodents

Piper, S. E., and Ethelbert Johnson. Some studies of Peromyscus and other rodents in the San Bernardino Mountains of California 1937 to 1940, California Dept. Agr. (Sacramento) Bul., 29(3), 1940, pp. 131-145, 1 fig.

Four species of Peromyscus, 5 of squirrels, and one wood rat are being combated as carriers of sylvatic plague. The Peromyscus proved especially difficult to poison. Tests of their preferences among bait materials and poisoned baits both in the field and laboratory are reported upon. Alternation of baits is necessary to success. Three newly devised toxic baits that were effective are described.

Control: Water weeds

Brown, C. J. D. Water weeds--their value and control, Michigan Conservation (Michigan Dept. of Conservation, State Office Bldg., Lansing), 9(10), Aug. 1940, pp. 6-7, 11, 4 photos.

Plants that require control under certain conditions and suggestions as to means including chemicals and mechanical devices.

Cycles

Braestrup, F. W. The periodic die-off in certain herbivorous mammals and birds, Science (Lancaster, Pa. 15 cents a copy), 92(2390), Oct. 18, 1940, pp. 354-355.

The cause of shock-disease, agent in the die-off of snowshoe hares, is unknown but it may be dietary deficiency. That might depend upon the mineral content of plants, and that in turn upon climatic factors. This reasoning admits of the explanation of cycles in organisms by the indirect influence of meteorological phenomena. References to 17 cognate publications.

Cycles: Fox, Red

Cross, E. C. Periodic fluctuations in numbers of the red fox in Ontario, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(3), Aug. 1940, pp. 294-306, 5 figs., tables.

Digest of fur returns of the Hudson's Bay Company for Ontario, 1916-1937 with special consideration of the records of individual trading-posts. Figures representing all parts of Canada seem to support the theory of cycles, but upon local analysis, assume a different aspect. "The concept of a Canadian fur cycle in the generally accepted sense of a sort of continent-wide biological tide is an intriguing speculation but on the basis of the evidence brought forward to date it must be regarded as 'not proven'." Bibliography of 7 titles.

Cycles: Grouse, Ruffed

Tubbs, F. F. Grouse cycles, Michigan Conservation (Michigan Dept. of Conservation, State Office Bldg., Lansing), 9(12), Oct. 1940, pp. 2, 10.

Review of game reports since 1896 showing that fluctuations in the numbers of grouse occurred but until recently they were not understood. The author believes there is no need to change the hunting regulations in response to phases of the cycle--the scarcity of the birds evidently protecting them during "lows."

Cycles: Hare, Snowshoe

Chitty, Dennis, and Charles Elton. The snowshoe rabbit enquiry 1938-39, Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 25 cents a copy), 54(8), Nov. 1940, pp. 117-124, 2 figs., 2 tables.

Continuation of a series previously noted in WILDLIFE REVIEW. The summary indicates that the years 1937-38, 1938-39 "have been, generally speaking, a period of recovery from the bottom of the latest ten year cycle, but there were well marked regional differences in phase." The details are discussed, mapped, and tabulated for both Canada and the United States.

Cycles: Hare, Snowshoe

Green, Robert G. Once more the grouse are back, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul, Minn.), 1(3), Dec. 1940, pp. 11-14, 1 fig.

Sketch of the snowshoe hare cycle and graph showing the population range revealed by 8 years of study--from 478 to 32 hares per square mile. The grouse cycle, not so well known, is nevertheless real and should be taken into account in defining open and close seasons. A number of questions are presented, satisfactory answers to which are needed as a guide to management.

Cycles: Hare, Snowshoe

Green, R. G., and C. A. Evans. Studies on a population cycle of snowshoe hares on the Lake Alexander Area. III. Effect of reproduction and mortalities of young hares on the cycle, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 347-358, 3 figs., 5 tables.

Authors' abstract: "On the basis of findings in 230 female hares, of which 140 were pregnant, collected during the reproductive seasons of seven years (1932-1938), it is concluded that a relatively constant reproductive rate was maintained throughout the years when the snowshoe hare population was undergoing changes from maximum abundance to greatest scarcity in Minnesota. No significant differences were noted in the various years in the duration of the reproductive season, the proportion of female hares pregnant at various times during that season, and the average number of embryos to the pregnant hare. By combining the data on reproduction with that pertaining to annual censuses and the determination of age ratios (Papers I and II), we obtain an estimate of the number of hares born each year and of the mortality rate among these hares during the first nine months of life. The mortality among young hares showed pronounced variations synchronous with the several stages of the cycle. In the years 1933 through 1937, the rate of survival of young hares varied between 8 and 29 per cent, and the population decreased markedly. Of the hares born in 1932 and in 1938, a much greater proportion survived, and, as a result, the population increased in those years. It is concluded that variation in the mortality among young animals was the principal factor in the fluctuation of

the population of hares on the Lake Alexander Area during the recent cycle." Bibliography of 5 titles.

Destruction: Bison

[Halliday, W. E. D.] The reduction of the buffalo herds, Forest and Outdoors (610 Canada Cement Bldg., Montreal, Canada), 36(8), Aug. 1940, pp. 257-258, 1 photo.

Destruction of the Wainwright herd was decided upon as a sanitary measure. A high proportion of the animals were affected by tuberculosis and many were infested by liver flukes, a problem complicated by the presence of elk. The range is to be kept fenced and free from grazing animals. Finally if restocking is considered desirable, healthy animals can be released in a disease-free habitat. Notes on the stock of bisons at other points are given to show that the animals are in no danger of extermination.

Destruction: Fox, Kit

Bunker, C. D. The kit fox, Science (Lancaster, Pa. 15 cents a copy), 92(2376), July 12, 1940, pp. 35-36.

George A. Allman, an early settler in the West, a government guide, and fossil collector, told the writer "that it was the general custom of the early cattlemen to place poison at all the undevoured buffalo carcasses to destroy wolves. It was his observation that the little swift foxes were always the first to take the poison. He stated that the gray wolf had not been seen in Kansas since 1879."

Diseases and Parasites

Dikmans, G. Helminth parasites of North American semidomesticated and wild ruminants, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(2), July 1939, pp. 97-101, 1 table.

Tabulation of some 40 kinds of nematodes, trematodes, and cestodes known from 12 species of big game ruminants. Review of the literature and citation of 16 titles.

Diseases and Parasites

Dinaburg, A. G. Helminth parasites collected from deer, Odocoileus virginianus, in Florida, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(2), July 1939, pp. 102-104, 2 tables.

Of 308 deer examined, 198 or 64% were infested; the incidence of 2 group of trematodes and 8 of nematodes is tabulated. Individual records from several other localities also are mentioned.

Diseases and Parasites: Acanthocephala

Van Cleave, Harley J., and Wm. C. Starrett. The Acanthocephala of wild ducks in central Illinois, with descriptions of two new species, Trans. Amer. Micr. Soc. (James E. Ackert, Kansas State College, Manhattan. 75 cents a copy), 59(3), July 1940, pp. 348-353, 1 pl.

Twenty-one out of 56 ducks representing 8 species were infected. Five species of Acanthocephala were found, of which 2 are described as new: Polymorphus cucullatus from the hooded merganser and P. acutis from the mallard. These species are illustrated and all are annotated. Bibliography of 6 titles.

Diseases and Parasites: Acarina

Matheson, Robert. Ticks and disease with special reference to spotted fever and tularaemia in the eastern States, Cornell Veterinarian (Ithaca, N. Y.), 30(2), April 1940, pp. 167-177, 6 figs., 1 table.

General discussion of ticks, their life histories, and relations to diseases; birds and mammals mentioned.

Diseases and Parasites: Aspergillosis

Davis, W. A., and L. S. McClung. Aspergillosis in wild herring gulls, Journ. Bacteriology (Williams & Wilkins Co., Baltimore, Md.), 40(2), Aug. 1940, pp. 321-323, 1 fig.

Epizootic in Massachusetts, symptoms, lesions.

Diseases and Parasites: Cestoda, Cladotaenia

McIntosh, Allen. A new taenioid cestode, Cladotaenia foxi from a falcon, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 7(2), July 1940, pp. 71-74, 1 fig.

From the duck hawk; description, illustration, comparative notes; previous records of the genus from North America; discussion of the characters of the genus and list of included species.

Diseases and Parasites: Cestoda, Dendrouterina

Olsen, O. Wilford. The cysticercoid of the tapeworm Dendrouterina nycticoracis Olsen, 1937 (Dilepididae), Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(1), Jan. 1939, pp. 20-21, 1 fig.

From catfishes (Ameiurus nelas), Minnesota; the third host probably is a water flea; description, illustration.

Diseases and Parasites: Chastek paralysis

Green, R. G., and C. A. Evans. A deficiency disease of foxes, Science (Lancaster, Pa. 15 cents a copy), 92(2381), Aug. 16, 1940, pp. 154-155.

The Chastek paralysis dealt with in papers abstracted in previous issues of WILDLIFE REVIEW (Nos. 4, June 1936, p. 4; 6, Nov. 1936, p. 10; 10, Oct. 1937, p. 8; 15, July 1936, p. 8; 16, Nov. 1938, p. 8; and 19, April 1939, p. 16). Account of occurrence, cause, symptoms, and pathology. Authors' summary: "A common and highly destructive dietary disease of silver foxes in captivity is pathologically the counterpart of Wernicke's hemorrhagic polioencephalitis of man. The disease in foxes is caused by feeding fish as 10 per cent., or more, of the diet. It is probable that the fish induce a B_1 avitaminosis which causes the characteristic pathology and the resultant symptoms."

Diseases and Parasites: Diptera, Protocalliphora

Guberlet, John E., and H. H. Hotson. A fly maggot attacking young birds with observations on its life history, Murrelet (Mrs. Martha Flahaut, State Museum, Seattle, Wash. 50 cents a copy), 21(3), Sept.-Dec. 1940, pp. 65-68, 4 figs.

Review of knowledge of Protocalliphora and citation of 12 references to literature. Notes on appearance and structure of the larva (illus.) and on life history. The paper is based on observations upon a single English sparrow nestling which died as a result of subcutaneous infestation by 21 maggots.

Diseases and Parasites: Lead poisoning

Toner, G. C. Duck mortality in the Cataraqui Marshes, Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 25 cents a copy), 54(7), Oct. 1940, pp. 104-105.

Near Kingston, Ontario; four dead and three sick birds (among 6 and 4, respectively) appeared to have lead poisoning. Bibliography of 7 titles.

Diseases and Parasites: Nematoda

Dikmans, G. Two new nematodes from rodents, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(1), Jan. 1939, pp. 1-4, 2 figs.

Citellincides zapodis n. gen. et. sp. from jumping mice (Napeozapus), N. C., and Muriclus harpespiculis n. gen. et. sp. from a pika (Ochotona), Wyo.; described and illustrated.

Diseases and Parasites: Nematoda

Dikmans, G. A note on the genera Nematospiroides Baylis, 1936, and Sincosta Roe, 1929 (Nematoda, Heligmosomidae), with descriptions of two new species of Nematospiroides, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 7(2), July 1940, pp. 79-82, 1 fig.

Comparison of the genera named; descriptions and illustrations of N. longispiculatatus from meadow mouse and muskrat (D. C. and N. J.) and N. carolinensis from red-backed mouse (N. C.). Key to 3 species of Nematospiroides.

Diseases and Parasites: Nematoda, Aproctella

Cram, Eloise B. Redescription and emendation of the genus Aproctella (Filariidae), nematodes from gallinaceous birds, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(2), July 1939, pp. 24-25.

A. stoddardi from bob-white and ruffed grouse.

Diseases and Parasites: Nematoda, Diplotriaena

Morgan, B. B., and E. F. Waller. The occurrence of a rare filariid nematode from a crow, American Midland Naturalist (University of Notre Dame, Notre Dame, Ind. $1.00 a copy), 24(2), Sept. 1940, pp. 379-381.

D. tricuspis in Iowa; description; notes on other microfilaria in birds; bibliography of 12 titles.

Diseases and Parasites: Nematoda, Quadriplotriaena

Wehr, E. E. New genera and species of Filarioidea II. Quadriplotriaena dolichodemus n. gen., n. sp., Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(1), Jan. 1939, pp. 32-33, 1 fig.

From the magpie, Montana; description, illustration; key to 3 genera of Diplotriaeninae.

Diseases and Parasites: Nematoda, Sarconema

Wehr, Everett E. New genera and species of Filarioidea. III. Sarconema eurycerca n. gen., n. sp., Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(2), July 1939, pp. 95-97, 1 fig.

From the whistling swan, Wisc. and Utah; description, illustration.

Diseases and Parasites: Parasites of Illinois game

Leigh, W. Henry. Preliminary studies on parasites of upland game birds and fur-bearing mammals in Illinois, Illinois Natural History Survey (Urbana), Bul. 21(5), Aug. 1940, pp. 185-194, 1 pl., 2 figs., 2 tables.

Discussion of parasites both internal and external (so far as found) of the prairie chicken, bob-white, and ring-necked pheasant; and of the helminths of the opossum, red fox, raccoon, skunk, and muskrat. Bibliography of 19 titles

Diseases and Parasites: Plague

Byington, L. B. Two epizootics of plague infection in wild rodents in the western United States in 1938, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(33), Aug. 16, 1940, pp. 1496-1501, 3 figs., 3 tables.

Lincoln County, Wyoming, involving Uinta and Wyoming ground squirrels, woodchuck, and prairie-dog; and Catron County, New Mexico, affecting Say's rock squirrel, white-footed mouse, and zuni prairie-dog. Author's conclusion: "Epizootic outbreaks of plague in rodents are occurring in the western United States. These are part of a widespread enzootic of the disease in many species of rodents. The two outbreaks here reported took place in regions sparsely inhabited by man and no human cases were known to have been associated with the infection in rodents."

Diseases and Parasites: Porocephaliasis

Penn, George H., Jr., and Ernest C. Martin. The occurrence of porocephaliasis in the Louisiana muskrat, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941, pp. 13-14.

Authors' abstract: "1,032 carcasses of muskrats (Ondatra zibethica rivalicia) from southeastern and southwestern Louisiana were examined. Nymphs of Porocephalus crotali are recorded for the first time from (the liver and lungs of) muskrats. Ninety-six (or 9.30%) had porocephaliasis, varying from a proportion of 14.5% and 13.0% at Willow Bayou Camp (Cameron Parish) and Michaud (Orleans Parish), to 1.2% and 2.5% at Road and Main Camps (Cameron Parish), respectively. One female was infested with over 1,600 nymphs. Histological examination showed nymphs isolated from the host tissue by a capsule of homogenous material. The investigation is being continued."

Diseases and Parasites: Protozoa, Sarcocystis

Erickson, Arnold B. Sarcocystis in birds, The Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 57(4), Oct. 1940, pp. 514-519, 1 pl.

Description of infestations in some Minnesota game birds, list of host birds of the world (20 species), and bibliography of 28 titles.

Diseases and Parasites: Prunus in relation to diseases of cultivated plants

Groh, Herbert, and Harold A. Senn. Prunus in eastern Canada, Canadian Journ. Research (National Research Council, Ottawa), 18(7), July 1940, pp. 318-346, 10 figs.

Key to 14 native or naturalized species with notes on their distribution. The paper was written to aid those who must consider the role of Prunus in the maintenance of certain economically important plant diseases. Instances cited are the serving as hosts for leafhoppers and aphids that transmit peach and potato diseases. Cultivated and naturalized species are considered of little significance but the choke cherry probably is, and the bird cherry may be, of importance.

Objections to Prunus, a genus of considerable value to wildlife, thus increase and the problem of what to do about these plants is further complicated for the wildlife manager. Not only Prunus but other genera desirable from the wildlife standpoint are involved. Whether economically harmless but still biologically valuable species, or whether unrelated and harmless substitutes, can be found, the problem is one that should receive the serious consideration of both researchers and technicians in the wildlife field.

Diseases and Parasites: Rabbit parasites

Smith, Charles C. Notes on the food and parasites of the rabbits of a lowland area in Oklahoma, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 429-431, 2 tables.

Author's abstract: "The summer ranges of two species of rabbits (Sylvilagus floridanus alacer and S. a. aquaticus) in Cleveland County, Oklahoma, are distinct but in the winter the lowland areas to which the swamp rabbits are restricted are invaded by cottontails. Winter food habits and parasites of the two species of rabbits were compared during December and January, 1939-40. Both species fed largely on bark and twigs during the winter but ate also the tap-roots of sweet clover (Melilotus alba). Both showed a high percentage of infestation with the rabbit tapeworm (Cittotaenia ctenoides) while only the cottontails harbored larval dog tapeworms (Cysticercus pisiformis). The red stomach worm (Obeliscoides cuniculi) was limited to the swamp rabbits while Trichostrongylus calcaratus was present in a high percentage of both species. Two larvae of Multiceps serialis, the many-headed bladderworm stage of a dog tapeworm, were found in the cottontails. Data were obtained from 11 swamp rabbits and 32 cottontails."

Diseases and Parasites: Relapsing fever

Davis, Gordon E. Ticks and relapsing fever in the United States, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(51), Dec. 20, 1940, pp. 2347-2350, 2 tables.

The ticks concerned, all members of the genus Ornithodoros, are parasites of rodents and rabbits; records of infestation are given. Author's summary: "Six species of Ornithodoros have been recognized in the United States. One or more species have been reported from each of 17 States. Tick-borne relapsing fever is present in 11 States. The known vectors are turicata in Texas and Kansas, and hermsi in California, Colorado, and northern Idaho. O. parkeri is the only known species in a large area from which 17 cases have been reported. Spirochetes have been recovered from talaje collected in Arizona and from parkeri collected in Wyoming, Montana, and Utah." Bibliography of 23 titles.

Diseases and Parasites: Trematoda, Eurytrema

McIntosh, Allen. A new dicrocoeliid trematode, Eurytrema komareki n. sp., from a white footed mouse, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(1), Jan. 1939, pp. 18-19, 1 fig.

Locality, Georgia; description, illustration, comparative notes.

Diseases and Parasites: Trematoda, Leptophyllum

McIntosh, Allen. Description of a plagiorchid trematode, Leptophyllum tamiamiensis, n. sp., from a poisonous snake, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(2), July 1939, pp. 92-94, 1 fig.

From the cotton-mouth, Florida; description, illustration, comparative notes.

Diseases and Parasites: Trematoda, Opisthorchoidea

Price, Emmett W. A review of the trematode superfamily Opisthorchioidea, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 7(1), Jan. 1940, pp. 1-13, 1 table.

History of knowledge of the group, tabulation of characters of the cercariae, and discussion of those of adults. Revised diagnoses of the families and subfamilies, and lists of their included genera. Bibliography of 49 titles.

Diseases and Parasites: Trematoda, Plagiorchis

Olsen, O. Wilford. The occurrence of the fluke Plagiorchis potanini Skrjabin, 1928 in Franklin's gull (Larus pipixcan Wagl.) in North America, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(1), Jan. 1939, p. 20.

South Dakota; description.

Diseases and Parasites: Trematoda, Polystomatidae

Price, Emmett W. North American monogenetic trematodes. IV. The family Polystomatidae (Polystomatoidea), Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(2), July 1939, pp. 80-92, 1 fig.

Diagnosis of the superfamily and key to its families; diagnosis of the family and key to its subfamilies and genera. These are 7, of which 2 are described as new: Polystomoidella, genotype Polystoma oblongum Wright, and Neopolystoma for P. orbiculare Stunkard. Polystomoidella wharteni n. sp. also is described from North American turtles. Notes on all of the genera and species; illustrations; bibliography of 29 titles.

Diseases and Parasites: Trematoda, Pseudapatemon

McIntosh, Allen. Pseudapatemon aldousi, new species (Trematoda: Strigeidae) from the American woodcock, Philohela minor, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 7(1), Jan. 1940, pp. 14-16, 1 fig.

From New Brunswick and Maine; description, illustration, comparative notes.

Diseases and Parasites: Trematoda, Rhytidodoides

Price, Emmett W. A new genus and two new species of digenetic trematodes from a marine turtle, Proc. Helminthological Soc. Wash. (Edna M. Buhrer, U. S. Bureau of Plant Industry, Washington, D. C.), 6(1), Jan. 1939, pp. 24-25, 1 fig.

Rhytidodoides intestinalis and R. similis from Chelone mydas (zoological park specimen).

Diseases and Parasites: Ulcerative enteritis

Bass, Charles C. Observations on the specific cause and the nature of "quail disease" or ulcerative enteritis in quail, Proc. Soc. for Experimental Biol. and Medicine (A. J. Goldfarb, College of the City of New York), 42(2), Nov. 1939, pp. 377-380. Address of author, School of Medicine, Tulane University, New Orleans, La.

The author believes that the gram-positive Corynebacterium, reported by Morley and Wetmore (see WILDLIFE REVIEW No. 7, Dec. 1936, p. 8) as causative, is a secondary invador. He attributes the disease to a gram-negative bacillus (unnamed) and describes the methods he found successful in isolating it and in transmitting the infection to previously unaffected birds. He says, "Although I have not been able to find the specific organism in an egg before hatching, the observations x x x indicate that very young birds acquire quail disease through eggs infected with the specific organism and layed by carriers of the infection."

Ecology: Availability of bob-white foods

Chenault, Tandy P. The phenology of some bob-white food and cover plants in Brazos County, Texas, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 359-368, 1 chart.

Author's abstract: "This investigation determined the periods of the year in which some of the most important food plants produced the seeds on which bob-whites largely feed, and also the times when these and other plants were available as shelter in the post-oak type of central eastern Texas. As nearly as practicable, the first date of each phase of plant development was recorded; in some instances, however, the beginning of a particular phase was overlooked. It was easy, however, to determine the period during which a species or a group of species was at the peak of a given activity-phase. From the standpoint of food availability to quail, dissemination of the seeds proved to be the most important phase. Flowering was important as an indicator of the time when a certain species came into prominence. The plants fell naturally into four groups, namely, those flowering in winter, spring, summer, and autumn. There was only one wave of winter-flowering plants. Plants that bloomed in Spring usually sprouted during January and February. This group was the most numerous in species of all. Summer plants began flowering in June. Strangely enough, while this group had fewer representatives, it was possibly more important in producing quail food than any of the others. There was only one wave of autumn-flowering plants." Bibliography of 7 titles.

Ecology: Beaver vs. trout

Cook, David B. Beaver-trout relations, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(4), Nov. 1940, pp. 397-401.

Sketch of beaver habits, and colony formation and duration. The activities of the animals that affect trout include: cutting or drowning of streamside trees exposing the water to the sun, impounding water by dams, which usually tends to warm it, and through accumulation of vegetable debris, to use up oxygen and reduce the animal populations important as sources of trout food; the dams, moreover, obstruct movements of fishes and encourage over-fishing. They are also in various ways unfavorable to trout spawning. "Where the ponds are small, the stream flow irregular and subject to drought, or the temperatures low, beaver ponds will be of decided benefit to trout. Other values also are involved, as water storage, and usefulness to ducks, fur animals, and deer. Each stream should be studied individually and beaver relations appraised on their merits. Bibliography of 5 titles.

Ecology: Census methods

Cahalane, Victor H. A trap-removal census study of small mammals, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941, pp. 42-57, 2 pls., 11 figs.

Author's abstract: "Study plots were established in 'typical' areas of the ecologic communities of the Chiricahua Mountains, southeastern Arizona. Tracks, dens, feeding spots, and other evidences of the presence of small mammals were identified and counted. The animals were then trapped as rapidly as possible, using a large number of traps within the plots and on 'guard strips' surrounding the boundaries. A fairly constant index between signs of activity and actual population was thus established. By the use of such check plots, it is possible to make a final estimate of the total population of any larger area in the territory embraced in the study. The ratio of catch to signs, obtained from the trap records and sign counts made on the three census plots, is as follows: (1) Yellow pine community--Eutamias d. dorsalis, one to 9.6; Peromyscus maniculatus rufinus and P. boylii rowleyi, one to 11.3; (2) oak community--Citellus g. grammurus, one to 8.7; Eutamias d. dorsalis, one to 10.5; Peromyscus boylii rowleyi, one to 0.4; Neotoma a. albigula, one to 2.7; (3) mesquite-grass community--Thomomys bottae extensatus, one to 1; Dipodomys s. spectabilis, one to 0.4; Neotoma a. albigula, one to 0.29; other small rodents (Citellus, Perognathus, Dipodomys merriami, Onychomys, and Peromyscus), one to 2.15." Bibliography of 10 titles.

Ecology: Census methods, deer

Bennett, Logan J., P. F. English, and Randal McCain. A study of deer populations by use of pellet-group counts, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 398-403, 7 tables.

Authors' abstract: "Year-round pellet-group counts of white-tailed deer (Odocoileus v. virginianus and O. v. borealis) in several forest types in Pennsylvania indicated that such counts can be used for determining approximate deer populations, deer movements, and the utilization of forest types by deer. The counts were made monthly during the spring and summer on 1/10-acre quadrats and on strips 11 feet wide and varying from 700 to 2,640 feet in length."

Ecology: Cover mapping

Dalke, Paul D. Development of a statewide system of cover-mapping applicable to Missouri wildlife range, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941, pp. 103-107, 2 pls.

Author's abstract: "The succession of plant associations developing from uplands, flood plains, ponds, lakes, and swamps is indicated by the primary divisions of the cover types. Symbols are used to represent the various stages in succession within each series. The symbols for woodland cover types embrace dominant species, density, and age class. If an understory of shrubs is present it is indicated as the denominator of the overstory symbol. Density of vegetation is expressed by one, two, or three lines representing light, medium, or heavy growths. On agricultural lands it may be desirable to indicate permanent cover types in areas as small as two acres. In Missouri for general wildlife management purposes, twenty-four upland types are recognized, seven in the flood plain succession and seven in the pond, lake, and swamp series. Base

maps are prepared from aerial photographs on a scale of 4" = 1 mile." Bibliography of 8 titles.

Ecology: Effects of flooding

Trimble, Ruth. Changes in bird life at Pymatuning Lake, Pennsylvania, Annals Carnegie Museum (Pittsburgh, Pa.), 28, pp. 83-132, Pls. 8-11, Oct. 1940.

Of interest to wildlife managers as reporting changes in bird life following flooding. The original character of the Pymatuning bog is described and the history of the tract sketched. It is now a wildlife refuge under jurisdiction of the Pennsylvania Game Commission. An annotated list of species is presented and comparisons drawn with those recorded for 1928 which show that 22 migrants, 5 accidental visitants, and 15 breeding species have been added to the avifauna mostly in response to changes in ecology due to flooding.

Ecology: Effects of hurricane

Woods, Gordon T. New England hurricane benefits wildlife, American Forests (American Forestry Assoc., 919 Seventeenth St., N. W., Washington, D. C. 35 cents a copy), 46(9), Sept. 1940, pp. 402-404, 424.

Author's abstract: "Although thirteen hurricanes have crossed New England within the last century, none of these inflicted such destruction and disaster nor improved forest wildlife conditions as did the hurricane of September 21, 1938. Because a large part of New England's wildlife is dependent on wooded areas for all or part of its habitat, the question has arisen as to the effect of the 1938 hurricane on wildlife. It is believed that the storm did more for the wild animals than man could have done in fifty years.

"Openings made in forest canopies allowed for increased plant growth and a greater variety of food plants. Considerable browse was made available to deer and rabbits by fallen trees. Trees which have fallen into streams or along lake shores furnish support for large numbers of insects and other aquatic organisms. Upturned root systems not only provide excellent dusting places where animals may rid themselves of external parasites, but grit and minerals will be available after deep snowfalls. The storage of logs in ponds has restricted boat fishing, and the resulting shade has been beneficial to trout ponds. Furthermore, bark dropping to the bottom has increased the fertility of these ponds. Conditions for fur-bearers have also been improved.

"We do not need windstorms to create productive habitats. Intelligent environmental improvement by man is obviously less expensive and far more beneficial than are conditions created by high winds."

Ecology: Effects of logging

Hormay, A. L. The effect of logging on forage, Chronica Botanica (Box 151, Waltham, Mass. 40 cents a copy), 6(1), Oct. 7, 1940, pp. 6-7, 2 tables.

"From general field observations it appears that grazing capacity is reduced for a year or two following logging and then rapidly builds up and surpasses the capacity of the virgin timber forage. As tree reproduction reoccupies the ground the grazing capacity reaches a maximum and then slowly takes a downward trend." This paper deals with only the first phase of the cycle. It lists the principal forage plants, gives the percentage of utilization of each, and shows that about a 20 percent reduction in forage immediately follows logging.

Ecology: Grassland

Carpenter, J. Richard. The grassland biome, Ecological Monographs (Duke University Press, Durham, N. C. $1.50 a copy), 10(4), Oct. 1940, pp. 617-684, 7 figs., 7 tables.

Associations and relationships of the principal plants and animals, including the vertebrates. Extensive bibliography.

Ecology: In land use

Graham, Edward H. Ecology and land use, Soil Conservation (Supt. of Documents, Washington, D. C. 10 cents a copy), Nov. 1940, pp. 123-128, 6 photos, 2 diagrams.

An essay on the desirability of applying ecological thinking in land use. Familiar ecological problems cited are those of the relations of: Mice, cover, and trees in orchards; snowshoe hares and small mammals to forest reproduction; and rabbits and rodents, coyotes, and livestock on the range. "To think ecologically requires only a knowledge of facts and an ability to relate them correctly." In some instances, technical assistance may be needed in the proper interpretation of the facts. Indicative phases of hemlock-hardwood forest, and of wheatgrass grazing land are described in illustration of methods of ecological appraisal. Good management often consists of arrest of succession and maintenance of the stage desired by man. This is illustrated by the use of controlled burning to favor growth of leguminous food plants in longleaf pine lands. Although dealing with elements largely exotic (unfortunate introduction of which is discussed), the operations of the Soil Conservation Service so far as possible are based on ecological concepts.

Ecology: Mosquito control operations

Stearns, L. A., Donald MacCreary, and F. G. Daigh. Effects of ditching for mosquito control on the muskrat population of a Delaware tidal marsh, Del. Agr. Expt. Sta. Bul. (Newark) 225, 55 pp., 24 figs., 8 tables, April 1940 (received August).

The total annual catch of muskrats is about 150,000. Sale of pelts provides an important part of the cash income of many farmers; worth while returns also are obtained from the meat. "Good muskrat marshes are generally considered to be fully as valuable as any farm land." From an observational and experimental study, the results of which are given in detail, it is con-

cluded that effective ditching rapidly lowers the water table and in a short time brings about changes in the vegetation, replacing plants that are useful by others that are practically worthless. Good muskrat marshes are relatively unimportant in mosquito production. Needs of the human population may call for their drainage but this should be done only where necessary. Control operations in some sections are unwarranted. Bibliography of 23 titles.

Ecology: Pheasant, Ring-necked

Leedy, Daniel L. Natural pheasant production in relation to agricultural land use, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 137, 9 pp. (mimeographed), 1940.

Condensation of a Doctor's thesis (of 229 pages, with a bibliography of 89 titles, and with 28 illustrations). Objectives of the study are stated, and the distribution of the pheasant and factors in its ecology are discussed. Food habits and economic status are summarized. Other topics treated are: Farm practices affecting the availability of pheasant food and cover, land use in relation to pheasant mortality and nest destruction, and the importance of crop and other lands in the life equation of the pheasant. A list of 8 indicators of superior pheasant range concludes the abstract.

Ecology: Populations, Bird

Hickey, Joseph J. Bird-Lore's fourth breeding-bird census, Bird-Lore (1006 Fifth Ave., New York, N. Y. 20 cents a copy), 42(5), Sept.-Oct. 1940, Supplement, pp. 474-492.

Reports from 14 States, with descriptions of habitats and lists of species with their numbers, often showing comparative figures for a series of years. Primarily studies of population densities, the results in most instances being expressed in pairs per 100 acres.

Ecology: Populations, Fox

Wade, Douglas E. Some more foxy business, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(6), Sept. 1940, pp. 6-7, 29, 4 figs., 2 tables.

Populations of red and gray foxes and their trends in Pennsylvania, 1933-40. Both have recently been increasing from a low in 1935-36; a cycle is indicated. Data bearing on the density of fox populations are summarized in maps and tables. The take of gray foxes for bounties was at the rate of one animal to from 1.4 to 3.8 square miles in various counties.

Ecology: Populations, mouse, Deer

Blair, W. Frank. A study of prairie deer-mouse populations in southern Michigan, American Midland Naturalist (University of Notre Dame, Notre Dame, Ind. $1.00 a copy), 24(2), Sept. 1940, pp. 273-305, 4 figs., 6 tables.

Peromyscus maniculatus bairdii. The live-trapping method and the marking technique are described and the ecological associations, populations, and ranges discussed. Abundance varies (maximum 9.2 per acre) and there is a marked seasonal cycle in numbers. Home ranges overlapped and averaged .51 acre for females and .63 acre for males. Sex ratio, even; average number of young per litter, 4; number of broods per year, 4. Bibliography of 16 titles.

Ecology: Populations, numbers and weights

Mohr, Carl O. Comparative populations of game, fur, and other mammals. American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 24(3), Nov. 1940, pp. 581-584, 1 fig.

Citation of 18 cognate references, the results in which have been analyzed and graphed to show the numbers of individuals per acre and the total weights of the populations per square mile. The results have so much consistency that the author suggests comparison with them as a test of the accuracy of new censuses. The total weight of each herbivorous species seldom exceeds 640 pounds, and of each predatory species, 75 pounds, to the square mile.

Ecology: Populations, Shrew, Short-tailed

Blair, W. Frank. Notes on home ranges and populations of the short-tailed shrew, Ecology (Prince & Lemon Sts., Lancaster, Pa. $1.50 a copy), 21(2), April 1940, pp. 285-288.

Study in Livingston County, Michigan, 1938-39. Largest home range of a male 4.43 acres, of a female 0.88 acre. Sex ratio about even. Populations from 0.8 to 2.2 individuals per acre. Bibliography of 11 titles.

Economics: Damage by crows

Craig, J. W. Crow damage to conifers, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 38(12), Dec. 1940, p. 969.

Breaking off shoots and branches of planted Scotch, red, and white pines, New York. Most damage along highways where animals killed by automobiles attracted the crows. "Although the effects of the injuries persist for several years, no evidence has been found to indicate serious consequences. The principal result is a poor form of the roadside trees."

Economics: Whales

Brandt, Karl. Whale oil. An economic analysis (Food Research Institute, Stanford University, California), xii+264 pp., 30 charts, 30 tables, 1940.

An exhaustive work but not a conservation document; throughout whales are treated strictly as a "source of wealth." Some chapter headings indicating the nature of the contents are: Whales as a source of raw materials; The rise, decay, and revival of whaling; Modern whaling; International competition in

whaling; International cooperation in whaling; and The outlook for whale oil and whaling.

Education: Conservation

Ward, Henry B., et al. Education in conservation, National Wildlife Federation (1212 Sixteenth St., N. W., Washington, D. C. 10 cents a copy), 39 pp., 1940.

Minutes of a committee meeting and other discussion on conservation education in the public schools. Henry B. Ward urges enlisting the aid of those who are training the teachers of today and tomorrow, the preparation of teaching material that will be locally suitable, the development of constant promoters of the movement, and the study of nature more than books. R. Worth Peters points out the interdependence of education and legislation, they must be developed together; conservation education should be given a definite place in State curricula; he also advises working with the living world. D. L. Kinnear cites the need of reworking technical material so that it can be used in teaching children, and the value of films, lantern slides, and other illustrative material, made at least in part by the students themselves; teaching material should have direct local application, and helps should be provided for leaders on field trips. Frank Thone advises all possible use of the results of research--the propagation of existing knowledge. Watson Davis urges the educational value of the newspaper; emotional reporting arouses interest, thus preparing the way for education. Howard Zahniser stresses simplification of the conservation message and persistence in repeating it in an interesting way.

The publication includes also a partially annotated program of the Fifth North American Wildlife Conference held in Washington, D. C., March 18-20, 1940.

Food Habits: Animals injurious to forest reproduction

Moore, A. W. Wild animal damage to seed and seedlings on cut-over Douglas fir lands of Oregon and Washington, U. S. Dept. of Agriculture Tech. Bul. 706 (Supt. of Documents, Washington, D. C. 5 cents a copy), 28 pp., 14 figs., 9 tables.

The habits and abundance of the principal seed-eaters and the influence of slash burning upon their populations are treated in some detail. Injury to trees and indices of damage also are discussed. Part of author's summary: "Seed-eating mammals, active at all times of the year, find in forest-tree seeds a favorite food. White-footed mice are the most important consumers, as they occur over the entire region. The shrew and related forms, although classed as insect eaters, also take heavy toll of seeds, owing to their great abundance in the coastal strip. Squirrels, chipmunks, and other mammals are of minor importance in total seed consumption. Reproduction from such seeds as escape and germinate furnishes food for browsing animals. The brush and snowshoe rabbits, common in the region, do the greatest amount of cropping. The mountain beaver plays a minor role, as apparently do big-game animals also. Artificial reforestation appears to suffer more from animal attack than does natural regeneration. Population counts of animals give unstable readings as

to measurements of damage, because of the ever-present factor of variables." Bibliography of 13 titles.

Food Habits: Nutritional requirements, white-tailed deer

Forbes, E. B., L. F. Marcy, A. LeRoy Voris, and C. E. French. The digestive capacities of the white-tailed deer, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941, pp. 108-114, 1 pl., 3 tables.

Authors' abstract: "The digestive capacities of the white-tailed deer were found to be in general like those of other ruminants. In comparison with rabbits, deer digest the protein, ether extract, and nitrogen-free extract of concentrated feeds about as do rabbits, but digest the same classes of nutrients in browse more efficiently than do rabbits. Neither deer nor rabbits digest crude fiber efficiently, but deer digest it much more efficiently than do rabbits. The rabbit caecum, therefore, is not the physiologic equivalent of the ruminant paunch. When the digestibility of willow browse, dogwood browse, and acorns was determined by difference between that of a concentrated feed and that of the concentrate plus the browse or acorns, the digestibility of the constituents of the coarse feeds appeared to be in all cases low and in several cases had negative values. Winter browse for deer should be regarded as a maintenance, rather than as a highly nutritious, feed. A ration of leafy alfalfa hay 50%, whole corn 45%, and pea-size soy bean oil cake 5%, is satisfactory for deer in confinement. Deer will eat bone meal mixed with salt but their requirements for these products are small."

Food Habits: Rodents eating bone

Carlson, A. J. Eating of bone by the pregnant and lactating gray squirrel, Science (Lancaster, Pa. 15 cents a copy), 91(2372), June 14, 1940, p. 573.

Daily feeding on dried bone suggests an appetite for calcium and phosphorus during pregnancy and lactation. Chicago, Ill.

Food Habits: Rodents eating bone

Coventry, A. F. The eating of bone by squirrels, Science (Lancaster, Pa. 15 cents a copy), 92(2380), Aug. 9, 1940, p. 128.

Red squirrel gnawing twice daily on an old moose skull. Lake Temagami, Ontario.

Food Habits: Rodents eating bone

Woodbury, Angus M. Antler eating by rodents, Science (Lancaster, Pa. 15 cents a copy), 92(2380), Aug. 9, 1940, pp. 127-128.

Probability that mice consume shed antlers. Utah.

Food Habits: Utilization of aquatic plants

Bellrose, Frank C., Jr., and Harry G. Anderson. Preliminary report on availability and use of waterfowl food plants in the Illinois River Valley, Illinois Natural History Survey (Urbana), Biol. Note 15, 14 pp., 5 tables.(mimeographed), 1940.

Field study of the plants and laboratory analyses of stomach contents from corresponding localities were made and index ratings obtained by dividing the percent of use by the percent of abundance. The areas studied are briefly described and possible sources of error discussed. The most serious as concerns the relation of use to availability is that the measure of abundance is that of plants rather than of the parts eaten. For instance, button-bush and American lotus make great masses of vegetation, a very insignificant proportion of which is edible by waterfowl. The same objection applies in the case of all plants of which only the seeds are eaten. The authors rate rice cut-grass and coontail as most valuable among 17 groups, the utilization of which is summarized.

Food Habits: Utilization of Lespedeza

Kistler, J. W. Common lespedeza. An important natural quail food plant, North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh, N. C.), 4(12), Dec. 1940, pp. 5-6, 15-16.

Origin, introduction, adaptability, and spread of the plant; vernacular names; value to quail. It made up 29 percent of all the food present in 178 crops and gizzards examined at North Carolina State College.

Food Habits: Utilization of oak products

Van Dersal, William R. Utilization of oaks by birds and mammals, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 404-428, 7 tables.

General review of the value of oaks to wildlife, with particular reference to the utilization of acorns and browse. Records from the literature (7-page bibliography) and other sources tabulated to show feeding on oak products by 186 species of birds and mammals and the number of animals known to patronize 53 species of oaks. The availability of acorns and the desirability of using oaks in plantings for wildlife are discussed.

Food Habits: Of coyote

Grimm, Rudolf L. Trout and crayfish eaten by coyotes, Journ. Mammalogy (Jm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(4), Nov. 1940, pp. 458-459.

In Yellowstone National Park, Wyo.

Food Habits: Of crow

MacArthur, Edward. Poor Jim Crow, Ohio Conservation Bul. (1106 State Office Bldg., Columbus, Ohio. 10 cents a copy), 4(9), Sept. 1940, pp. 12-13.

In urging that the crow is not as black as painted, the author discusses the points of view of the farmer, hunter, and ammunition manufacturer, abstracts the findings of food habits studies, and concludes that the species should have some degree of protection.

Food Habits: Of game birds

English, P. F., and Logan J. Bennett. November foods of ring-neck pheasants and bobwhites, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(6), Sept. 1940, pp. 8-9, 31, 2 figs., 5 tables.

Report on analyses of the food in 84 pheasant and 28 bob-white crops collected during the hunting season of 1939, and comparison with results obtained in 1938. Corn and ragweed hold their places as leaders in the diet of both birds, the former being in first rank for the pheasant and the latter for the quail. Appropriate management suggestions are made. Bibliography of 6 titles.

Food Habits: Of hawk, marsh

Randall, Pierce E. Seasonal food habits of the marsh hawk in Pennsylvania, Wilson Bul. (Gustav Swanson, University Farm, St. Paul, Minn. 60 cents a copy), 52(3), Sept. 1940, pp. 165-172, 3 tables.

Study of the marsh hawk in relation to the ring-necked pheasant, including analyses of 598 pellets. The results are tabulated and discussed for the four seasons and also for the year. Author's summary: "Mice formed the staple food of the Marsh Hawk during 10 months of the year. During June and July juvenile birds were the most important items of food. Many young birds were easily obtained at this season because of their exposure by mowing and harvesting. The effect of Marsh Hawks upon the pheasant population was negligible. There was no reason to believe that the hawks were a limiting factor on the other game species on the study area. The general food habits of the Marsh Hawk are beneficial to man, and this hawk is a decided asset to an agricultural community. Bibliography of 10 titles.

Food Habits: Of heron, blue

Kirkpatrick, Charles M. Some foods of young great blue herons, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 24(3), Nov. 1940, pp. 594-601, 3 figs., 1 table.

Discussion of food of the species as recorded in 6 previous papers. Account of collecting disgorged food at breeding colonies near Trout Lake, Wis-

consin, and descriptions, illustrations, and tabulations based on 297 food specimens. Fishes overwhelmingly predominated, ranged up to 16 inches in lengt (without head), and included many of game species. Half of them, however, were yellow perch, sometimes regarded as of most value as forage.

Food Habits: Of muskrat

Errington, Paul L. Versatility in feeding and population maintenance of the muskrat, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941, pp. 68-89.

"Author's abstract: "Data obtained on the food habits of the muskrat (Chiefly Ondatra zibethica in Iowa, 1934 to 1940) indicate that this important fur-bearer may be either selective or highly indiscriminate in its feeding, depending upon opportunities and necessity, individual tastes and habits, and what may perhaps be termed local custom. Certain foods as ear-corn and root-stocks of cat-tails and bulrushes may be both preferred and of superior quality most green vegetation is more or less adequate as food in warm weather, and populations may winter on dry grass and weeds and cold-blooded prey as frogs, fishes, and mussels; very harsh and innutritious fare, including corn cobs, rotting vegetation, and wood, may also be the principal diet of some animals for varying lengths of time in winter and spring. Because of this versatility in food utilization, muskrats of the agricultural northcentral region are not often subject to rapid or outright starvation. Shortage or unavailability of food in combination with winter vicissitudes, however, may on occasion result in decimation over wide areas, but the check that food deficiencies impose upon muskrat populations appears to be mainly indirect and, to at least some extent, psychological." Bibliography of 28 titles.

Food Habits: Of muskrat

Stearns, L. A., and M. J. Goodwin. Notes on the winter feeding of the muskrat in Delaware, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941, pp. 1-13, 1 fig., 5 tables.

Review of the literature on food habits and report on a study of nearly 3,000 animals as to the volumes and weights of the stomachs and their food contents. The average volume was 22-25 cc. and weight 1.52 grams; there was no sexual difference in these respects. Chemical analyses were made of composite samples of the animals' stomach contents and of food plants available in their environment. Proportions of crude protein and of ash, significantly higher in the ingested, than in the available, foods, indicated consumption of a notable amount of animal matter. Bibliography of 11 titles.

Food Habits: Of owl, barn

Blakemore, Lem. Barred owl food habits in Glenwood Park, Minneapolis, Minn., The Flicker (University of Minnesota, Minneapolis, Minn.), 12(3), Oct. 1940, pp. 21-23, 3 tables.

Report on contents of 36 pellets in which shrews and meadow mice were the items most frequently identified. No game bird remains were present; unusual items were skink and crayfish.

Food Habits: Of owl, burrowing

Scott, Thomas G. The western burrowing owl in Clay County, Iowa, in 1938, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 24(3), Nov. 1940, pp. 585-593, 1 pl., 2 tables.

General notes on the species and on 3 families studied; discussion of the food based chiefly on the contents of 250 pellets which are tabulated. The food items of most frequent occurrence were scarabaeid beetles, grasshoppers, and white-footed mice. Bibliography of 13 titles.

Food Habits: Of owl, horned

Errington, Paul L., Frances Hamerstrom, and F. N. Hamerstrom, Jr. The great horned owl and its prey in north-central United States, Iowa Agr. Expt. Station (Ames), Research Bul. 277, pp. 758-850, 4 figs., 12 tables, Sept. 1940 (Oct.)

Excellent report on a long-continued study that was extensive with respect to material (more than 4,800 pellets for one item) and intensive as to area and methods. The food habits of the owl are treated exhaustively as to trends in food utilization by seasons. Predation upon the principal groups of food animals is discussed in relation to their availability and as to its effects upon economically significant species. Rabbits, hares, and mice were the staple food items. There is an extended general discussion of predation by the great horned owl, including exposition of its relation to overpopulations of the bob-white and ruffed grouse; of its place in the combined activities of all predators--"a cross-play of predation, variable in source but compensatory in net effect"; of its relation to availability of prey; and of its effect upon prey populations. There is a bibliography of 119 titles, and an appendix giving details of the results of family and special phase studies of horned owl food habits.

Food Habits: Of owl, horned

McDowell, R. D. The great horned owl, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(8), Nov. 1940, pp. 10-11, 29, 2 photos, 1 map, 2 tables.

One table summarizes the weights and measurements of mature birds, some 800 of which were males and some 700 females. Averages for the sexes, respectively, were: Weight (lbs.) 2.8, 3.7; wingspread (inches) 52.8, 56.2; and length (inches) 21.3, 22.6. A second table presents the results of analysis of 983 stomachs. Leading items are rabbits, mice, rats, and poultry.

Food Habits: Of pelican, white

Bond, Richard M. Birds of Anaho Island, Pyramid Lake, Nevada, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(5), Sept.-Oct. 1940, pp. 246-250, Figs. 70-73, 1 table.

Annotated list of the birds with special discussion of the food habits of the white pelican and comparison of the results with those of E. Raymond Hall's investigation for the Biological Survey in 1924. "Now, as at the time of Hall's visit, local residents are convinced that the pelicans are seriously affecting the fishing in the lake." Then it was trout, now it is another species, but the charge seems no better founded.

Food Habits: Of raccoon

Giles, LeRoy W. Food habits of the raccoon in eastern Iowa, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 375-382, 1 table.

Author's abstract: "From Mar. 23-Dec. 7, 1938, 333 scats and 2 stomachs were collected in Dubuque Co., most of them on rock bluffs in which the raccoons denned. These were analysed for volume and frequency of occurrence of food materials. The food habits for the 9-months' period were separated into 4 divisions on the basis of predominating foods. 1. (Mar. 23-Apr. 16). Corn made up 78.99% of the fecal vol. for this period. Minor foods were crayfishes and small vertebrates. 2. (Apr. 19-June 20). Grass formed 37.09% of the total vol. and probably served as a tonic food. Insects, which made up 35.07%, were principally beetles (notably Phyllophaga spp.) and cutworms (Nephelodes emmedonia). Other food remains were hickory nuts, crayfishes, corn, vertebrates, and snails. 3. (June 20-Aug. 11). Wild raspberries (Rubus occidentalis and R. strigosus) were characteristic summer food. Their seeds were present in 54.54% of the scats and made up 32.17% of the vol. Of less importance were beetles, corn, gooseberries, vertebrates, and wild strawberries. 4. (Aug. 11-Dec. 7). Corn formed 85.19% of the food remains by vol. Its consumption increased during the fall until it was taken almost exclusively. Insects, especially grasshoppers (particularly Melanoplus femur-rubrum and M. differentialis) and to a less extent carabids, Polistes wasps, and hellgramites were represented in large numbers. Crayfishes, vertebrates, and misc. items were of comparatively small volumetric importance. The identifiable vertebrates eaten during the entire period included 5 fishes, 3 amphibians, 1 lizard, 7 snakes, 1 prairie mole, 23 rodents (largely mice), 19 small birds, and 1 young raccoon. Results of this study indicated that the raccoon has definitely vegetarian tendencies. Fully 77.73% of the combined fecal and stomach materials was of plant origin, while only 22.27% was animal."

Food Habits: Of robin

Hamilton, W. J., Jr. Summer food of the robin determined by fecal analysis, Wilson Bul. (Gustav Swanson, University Farm, St. Paul, Minn. 60 cents a copy), 52(3), Sept. 1940, pp. 179-182, 1 fig., 1 table.

Brief review of reports on the food habits of the robin which are most deficient with respect to the summer period. The author suggests that this deficiency can be made up by study of droppings. Results from analysis of about 700 of them are tabulated and discussed. In frequency of occurrence, beetles, cutworms, and ants lead among animal, and raspberries, blackberries, and wild cherries among the vegetable, foods. Bibliography of 5 titles, to which could be added a paper in The Auk, 57(3), July 1940, pp. 334-348, giving information on the food of birds derived from study of the contents of nest boxes.

Food Habits: Of starling

Dermon, E. L. 19th Annual Report, Southern Forest Expt. Station (New Orleans, La.), 1939 (1940), p. 24.

Starlings visiting longleaf pine forests in increasing numbers threaten great damage by consuming the seeds. Birds of several kinds now combine to make plantings futile.

Food Habits: Of turtle, snapping

Poll, S. Morris. Notes on the food habits of the common snapping turtle, Copeia (H. Graham Nettin, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1940(2), July, p. 131, 1 table.

Contents of 18 specimens from New York and New Jersey tabulated according to percentages of frequency and of bulk. Plant material comprised nearly 53 percent by volume; the largest item of animal food was crayfishes.

Food Habits: Of weasel, long-tailed

Polderboer, Emmet B., Lee W. Kuhn, and George O. Hendrickson. Winter and spring habits of weasels in central Iowa, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941, pp. 115-119, 1 pl., 2 tables.

Authors' abstract: "On 160 acres, typical of central Iowa farm land, by using 100-yard inventory strips in fresh snow and noting the trails crossed, 4 long-tailed weasels (Mustela frenata) and 1 considered as a least weasel (M. rixosa) were found. The average cruising radius of the long-tailed weasel was 25 rods. The preponderance of the weasel diet was mammalian, chiefly murine, with the genus Microtus most important, as shown by examination of 131 scats and debris of 3 den nests. A covey of 24 bob-whites (Colinus v. virginianus) and 14 ring-necked pheasants (Phasianus colchicus torquatus) often seen on the area were not harmed by the weasels in 5 months of observation. Of 10 cottontails (Sylvilagus floridanus mearnsii) lost from an estimated 35 at the start, 2 were known to have been taken by weasels, 2 by dogs, and 3 by hunters. Cannibalism occurred among the weasels as evidenced by least weasel remains in scats of a long-tailed weasel; this may indicate interspecific strife as a possible limiting factor in weasel populations. The known range of the least weasel is extended to include Story County, Iowa."

Food Habits: Of wild turkey

Good, Henry G., and Lloyd G. Webb. Spring foods of the wild turkey in Alabama, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 29(6), Nov.-Dec. 1940, pp. 283-290, 1 table.

Report on analyses of the food of 116 birds. It was nearly nine-tenths vegetable, of which the predominant item was oak products--acorns, leaves, and catkins. Other prominent foods were seeds of Nyssa, fruits, buds, and twigs of beech, berries of dogwood, and nuts and flowers of hickory. The animal food was chiefly insects. Competition between deer and turkeys is not severe but hogs should be removed from areas being developed for turkeys. Other management suggestions are made.

Introductions: Elk, Arizona

Kartchner, K. C. Elk introduction to Arizona, Arizona Wildlife and Sportsman (125 North 2nd Ave., Phoenix, Ariz. 15 cents a copy), 2(5), Aug. 1940, pp. 2, 11.

The native Arizona wapiti or Merriam's elk was exterminated by meat and trophy hunters, the last animal being killed in 1898. Introductions of Rocky Mountain elk, begun in 1913, proved so successful that an open season was permitted in 1935. Details are given of the various transplantings. Crop damage by the animals is increasing and the electric fence is being tried as a remedy.

Introductions: Elk, Minnesota

Swanson, Gustav. The American elk in Minnesota, Conservation Volunteer (Minnesota Dept. of Conservation, State Office Bldg., St. Paul), 1(2), Nov. 1940, pp. 5-7, 1 pl.

History of the elk in Minnesota where it was completely extirpated by 1900; natural reinvasion of the State is indicated by a 1932 record. Efforts at introduction began in 1913 but actual release in the wild did not occur until 1935. The animals have increased to about 100 and the future looks promising.

Life Histories: Beaver

Cook, Fannye A. Beaver study reveals damage to timber, corn only negligible, Mississippi Game and Fish (Mississippi Game and Fish Commission, Jackson), 4(12), Dec. 1940, p. 4.

Trees cut are small and of little value. Damage by feeding on corn and by flooding lands is seldom so extensive as to cause complaint. Conditions for fishes and wildfowl have been improved. Native beavers show a decided preference for small streams and introduced animals seek such places if not put there at first. The paper contains notes on dams, dens, lodges, activities, foods (20 plants listed), and breeding.

Life Histories: Chipmunk, Long-eared

Holdenried, Robert. A population study of the long-eared chipmunk (Eutamias quadrimaculatus) in the central Sierra Nevada, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(4), Nov. 1940, pp. 405-411, 1 fig., 2 tables.

Description of study area in Madera County, California, and of the trapping and marking methods employed. Catches and variations in numbers of the animals trapped are tabulated. The sex ratio was even. Males had a greater cruising radius than females. There are notes on food habits and trap mortality. Bibliography of 5 titles.

Life Histories: Goose, Snow

Howard, Wm. J. Wintering of the greater snow goose, The Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 57(4), Oct. 1940, pp. 523-531.

Notes on the extent and nature of the winter range in Virginia and North Carolina, and upon numbers, migrations, local movements, and feeding habits of the geese; discussion also of the ratio of adult to immature birds; occurrence of blue geese, predators, and protection and management. Bibliography of 10 titles.

Life Histories: Kangaroo rat, Santa Cruz

Hawbecker, Albert C. The burrowing and feeding habits of Dipodomys venustus, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(4), Nov. 1940, pp. 388-396, 1 pl., 1 fig.

Vegetational and other characteristics of the study site in Santa Cruz County, California, are described. Excavation of 15 dens yielded information as to their relatively simple nature and as to intruders. In ditch berms, dens were an erosion hazard but were easily eliminated by light disking. The food was chiefly annual seeds which were stored in both underground and surface caches. Various food plant species are named, the most important, however, under only vernacular names. The animals were harmful to crops at sowing time. Bibliography of 6 titles.

Life Histories: Mouse, Meadow

Allen, Durward L. Millions of little teeth, Michigan Conservation (Michigan Dept. of Conservation, State Office Bldg., Lansing, Mich.), 9(11), Sept. 1940, pp. 6-7, 10, 4 figs.

Chiefly on the food habits and life history of the meadow mouse (Microtus pennsylvanicus). Instances of damage to alfalfa, plantings of timber and ornamental trees, and orchards. Notes on life history and on natural enemies. "If we are going to profit by the immeasurable good done by these animals x x x we x x x have to put up with some of the things we may not like. There is a limit

to how much we can regiment nature." Good management requires skillful utilization, not elimination, of predators. Bibliography of 5 titles.

Life Histories: Pheasant, Ring-necked

Nelson, Urban C. Winter observations on pheasants in southeastern Minnesota, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 369-372, 4 tables.

Description of the area and of the writer's observations and analysis of the latter. Author's summary: "Deficiency in food and cover resulting in a high winter mortality is considered the limiting factor in the management of ring-necked pheasants in southeastern Minnesota. A field analysis, although based on relatively few observations on range with a low pheasant population, indicates the dependence of the birds on farm windbreaks, corn, and barnyard foods during the winter months. The value of the farm windbreak as cover is great on prairie land where standing corn provides food. Barnyard foods are of most value in areas where brush and woodland cover is available and there is a scarcity of standing corn. Improved management of the ring-necked pheasant should add better winter cover; planting of coniferous and hardwood cover in small areas well distributed over the farm would help. Feeding seems to be the principal activity of pheasants during daylight hours. Cocks have a nomadic tendency and often travel alone, while hens have a relatively short cruising radius and are more prone to flock."

Life Histories: Pheasant nesting, Ohio

Strode, Don H., and Daniel L. Leedy. The 1939 pheasant nesting study in Wood County, Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 135, 20 pp., 1 map, 14 tables (mimeographed), 1940.

The methods of the study are described and its results compared with those of previous years are tabulated in detail and discussed under a variety of heads. The average number of nests on 4 sections was 141; 58 percent of the nests were successful; the average hatch was 659 per section or slightly more than one per acre; the percentages of nests found and of those that succeeded were highest in sweetclover seed fields and in hay crops; the average number of eggs per clutch was 8.8; size of clutch decreased through the season; "Of 210 nests destroyed in all types of cover, 75.2% were destroyed by man, 12.4% by bird predators, 5.7% by mammalian predators; 1.9% by livestock, 1.0% by desertion, and 3.8% by unknown causes; of 24 incubating hens known to have been killed, 22 were killed by mowers and 2 by binders; the most successful nestings were those of the last 10 days of May and the first 10 days of June (time based on date first egg was laid); pasturing had but little apparent effect on pheasant nesting in woodlots, as there were 12.0 nests per 100 acres of unpastured woodlots and 12.2 per 100 acres of pastured woodlots. The percentage of nests that were successful was high in both types--64.3% in pastured woodlots, and 65.0% in unpastured woodlots; pheasant nesting success was somewhat lower near the field borders, possibly due to earlier cutting of field crops and to the use of

fencerows as travel lanes by predators; although the greatest percentage of nests (27.5%) was found within 50 feet of field borders, the nesting density (number of nests per 100 acres of cover), was greatest 151 to 200 feet from the edges of fields."

Life Histories: Redhead

Low, Jessop B. Production of the redhead (Nyroca americana) in Iowa, Wilson Bul. (Gustav Swanson, University Farm, St. Paul, Minn. 60 cents a copy), 52(3), Sept. 1940, pp. 153-164, 4 photos, 1 table.

Study at about the southern limit of the breeding range of the redhead as to its nesting habits, nesting cover, nest construction, juvenile rearing cover, and reproduction. Of 42 nests under observation, 23 were successful; only 38 percent of the eggs, however, produced young. Changing water level was the greatest destructive factor; infertility and desertion of eggs also were of importance. There was one nest to 16 acres of vegetative cover, and a production of 3.8 young to each pair of redheads. Bibliography of 10 titles.

Life Histories: Squirrel, Flying

Solberger, Dwight E. Notes on the life history of the small eastern flying squirrel, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(3), Aug. 1940, pp. 282-293.

Glaucomys v. volans. Observations on habitat, means of detecting the presence of flying squirrels, time of activity, degree of inactivity in winter, movements, voice, food, and temperament. Bibliography of 23 titles.

Life Histories: Squirrel, Fox

Baumgartner, Luther L. The fox squirrel: Its life history, habits, and management in Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 138, 7 pp. (mimeographed), 1940.

Condensation of a Doctor's thesis (of 257 pages, with a bibliography of 55 titles, and with 36 illustrations). Distribution and habitat are stated; more than 2,200 squirrels were examined; average weight of 143 adults was 793.5 grams (1.75 lbs.); average measurements of 62 adults are given, as well as information on the reproductive cycle ("true" sex ratio 52.56% male, average young per litter 3.23), food habits, movements, population levels (5-year average per 100 acres 90.2), mortality factors with considerable detail as to hunting, and management recommendations.

Life Histories: Toad

Bragg, Arthur N. Observations on the ecology and natural history of Anura. II. Habits, habitat, and breeding of Bufo woodhousii woodhousii (Girard) in Oklahoma, American Midland Naturalist (University of Notre Dame, Ind. $1.00 a copy), 24(2), Sept. 1940, pp. 306-321, 1 fig. (map).

Range, habitat, and habits, especially the breeding activities, and factors limiting numbers. Comparisons with B. cognatus. Bibliography of 31 titles.

Life Histories: Woodchuck

Moss, A. E. The woodchuck as a soil expert, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 441-443, 1 chart.

Author's abstract: "A detailed soil survey of a small woodland area offered opportunity to check the occurrence of woodchuck burrows in respect to topography, soil series, and types. There appeared to be very little relationship between topography or series but a close correlation between the occurrence of sandy loam and the burrows."

Life Histories: Wood rat

Vorhies, Charles T., and Walter P. Taylor. Life history and ecology of the white-throated wood rat, Neotoma albigula albigula Hartley, in relation to grazing in Arizona, University of Arizona (Tucson), Tech. Bul. 86, pp. 455-529, 8 pls., 7 figs., 8 tables.

Description, illustration, measurements, and weights of the animal are given, and its distribution, habitat, and habits are discussed. Under the latter topic are included statements of daily and seasonal activity, extent of home range (minimum 1/20 acre), sex ratio (nearly even), breeding season and rate (average number per litter 1.95), sex behavior, the young, dens, nests, and food and food habits. Cactus, mesquite, and grasses supply most of the vegetable food and ants are the largest item of animal sustenance. Den intruders, parasites, predators, and diseases are considered and population phenomena are discussed. Economic status is treated with respect to injurious, neutral, and beneficial effects of the wood rats. Control should be selective, individuals being disposed of wherever they are a definite nuisance. "But a general wood rat killing campaign on the open range would do no appreciable good to range forage. On the other hand, it would distract attention from the real cause of most difficulties encountered in the arid country--namely, too many livestock for the actual carrying capacity of the range." Bibliography of 31 titles.

Life Histories: Wood rat, Allegheny

Poole, Earl L. A life history sketch of the Allegheny woodrat, Journ. Mammalogy (Jos. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(3), Aug. 1940, pp. 249-270, 2 pls., 2 figs., tables.

Neotoma magister. Combined records from the literature and from correspondents, and notes on observations on the animals both in the wild and in captivity, presented under the heads of: Distribution, nests, food, use of water, sanitation, enemies, parasites, diseases, pelage and molt, adaptations, social life, and breeding and general habits. Bibliography of 25 titles.

Management: Attracting birds

Beattie, W. R. Useful and ornamental gourds, U. S. Dept. of Agriculture Farmers' Bul. 1849 (Supt. of Documents, Washington, D. C. 5 cents a copy), 13 pp., 8 figs., 1940.

Two pages (10-12) of this publication present an illustration of gourds in use for bird houses and text on the subject contributed by the Biological Survey; the bulletin supersedes U. S. D. A. Leaflet 36, "Gourds for bird houses and other purposes," 1929.

Management: Bears in national parks

Finley, Wm. L., and Irene Finley. To feed or not to feed--that is the bear question in Yellowstone National Park, American Forests (919 Seventeenth St., Washington, D. C. 35 cents a copy), 46(8), Aug. 1940, pp. 341-347, 368, 383-384, 7 photos.

Popular article on the park bears, their habits, and treatment. Pampering has made the bears tame but all the more dangerous. The authors conclude that the public as well as the park officials should abide by the stated policy that, "Presentation of the animal life of the parks to the public shall be a wholly natural one. No animal shall be encouraged to become dependent upon man for its support."

Management: Bob-white

Baker, Rollin H. Better quail shooting in east Texas, Texas Game, Fish, and Oyster Commission (Austin), Bul. 20, 18 pp., 10 photos, Sept. 1940.

Management suggestions for sandy land, longleaf pine woodland, blackland, and coastal prairie. For all areas the kill should be limited to a third of the fall supply and that should be ascertained by careful census. Plans are advanced for low-cost, and for intensive, management of each of the land types, and they relate to food, cover, burning, grazing, and predator control. Bibliography of 6 titles.

Management: Bob-white

Lay, Daniel W. Bob-white populations as affected by woodland management in eastern Texas, Texas Agr. Expt. Station (College Station), Bul. 592, 37 pp., 15 figs., 4 tables, 1940.

A satisfactory drive method of enumerating the birds is described and the results tabulated for cut-over areas in different stages of succession. The density of the quail population is greatest about 9 years after logging and rapidly declines with further growing up of the forest. The effects of lumbering arise from changes in cover and food plants that are discussed for the types of woodland and stages of succession. A tabulation is given of the food items identified from 56 bob-white stomachs collected in Walker and Trinity counties, both volume and frequency of occurrence being noted; Lespedeza and

Croton head the list. Management procedures suggested by the study deal with the establishing of headquarters food and cover patches, with brush cutting, plowing, burning, and grazing, and with the control of predators, regulation of hunting, and restocking. There is a summary and a bibliography of 7 titles.

Management: Bob-white

Stoddard, Herbert L. Cooperative Quail Study Association (Thomasville, Ga.) Eighth Ann. Rep., 27 pp., Aug. 1940.

In addition to information of interest chiefly to members, this leaflet contains comment on controlled fire as a tool in upland game management, on the improvement and maintenance of woodlands in relation to wildlife, effects of drought and of excessive rainfall on quail production, experimental and practical work with game food plantings, quail numbers and food supply, and on mammals, fire ants, and diseases in relation to quail.

Management: Deer, Pacific white-tailed

Scheffer, Victor B. A newly located herd of Pacific white-tailed deer, Journ. Mammalogy (Wm. B. Davis, A. & M. College, College Station, Texas. $1.00 a copy), 21(3), Aug. 1940, pp. 271-282, 1 pl.

Odocoileus virginianus leucurus. A group previously believed to have been extirpated is reported from the same locality where recorded by Lewis and Clark in 1806 near the mouth of the Columbia River. Notes are given on distribution and numbers of the deer in both Washington and Oregon, on their food supply and food habits, mortality, and parasites. There are about 500-700 of the animals but they are destructive to crops and may act as a reservoir of livestock diseases. It is suggested that the herd be moved to a lowland area less used for agriculture. Bibliography of 7 titles.

Management: Deer, White-tailed

Aldous, Shaler E. Deer management suggestions for northern white cedar types, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941. pp. 90-94, 2 figs.

Author's abstract: "Northern white cedar is one of the most desirable browse species for white-tailed deer in the Lake States Region, but because of excessive browsing, fires, and logging operations, has become progressively less available to the animals. To promote best utilization of the cedar now present but largely out of reach of deer, studies were made to determine the relative quantities of browse that various-sized trees produce, and the degree of browsing that can be permitted without depleting the annual output. Curves are given for computing the available browse from small living trees, from larger trees up to the seven-foot line, and from larger trees felled during logging operations, or cut expressly for deer. If browsing is kept below 25% of the leafy foliage annually, the smaller trees are potentially the best food producers as most of the foliage is within reach of deer. Only the lower

branches of larger trees can be browsed and the new growth is largely out of reach. Priority usage of winter concentration areas for deer and management to that end are advocated. White cedar sprays used in the floral market remove a large amount of browse from the forests, but the direct effect upon deer is not serious because these sprays can only be found in profitable quantities where deer are relatively scarce."

Management: Deer, White-tailed

Krefting, Laurits W. Methods of increasing deer browse, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941, pp. 95-102, 1 pl., 1 fig.

Author's abstract: "Two sorts of cutting to induce sprouting, the 'ground-line' and 'snow-line' methods, were experimented with in the Superior National Forest, northeastern Minnesota, over a 5-year period. Twenty-eight browse-study plots were established in which trembling aspen (Populus tremuloides), paper birch (Betula papyrifera), beaked hazel (Corylus cornuta), red-osier dogwood (Cornus stolonifera), and honeysuckle (Lonicera canadensis) were cut at the ground and snow levels to stimulate sprout growth. To facilitate comparison of productivity by both methods of treatment, the annual growth was clipped from treated and untreated samples between the ground level and 7 feet, weighed, and measured for length. A total of 40,656 stems were used. Costs ranged from $4.92 per acre in shrub types cut at the snow-line to $15 per acre in tree types cut at the same level. On a weight basis, red-osier dogwood ranked first and honeysuckle last, while on a length-of-growth basis trembling aspen was first, red-osier dogwood second, and mountain maple third. Practical application of the findings should avoid trembling aspen and paper birch and center on shrubs, particularly the mountain maple, and on the ground-line method of treatment. To obtain the desired results the forest canopy must be kept from shading out the desirable shrubs." Bibliography of 9 titles.

Management: Environmental improvement

Engelking, Truman G., and Ellis A Hicks. Iowa's wildlife packet, Iowa State College (Ames), Cooperative Extension Service, F 206, 6 pp., 2 pls., 1 table (mimeographed), 1940.

The value of aid to wildlife in winter is pointed out and as a contribution to that end the cooperators have arranged to supply at nominal cost ($1.00 plus transportation charges) packets containing 200 plants (enough for 1/4 acre at the recommended spacings) suitable for environmental improvement. Plans and suggestions for the planting are given, and the importance of installing feed patches also is stated. The form includes information on restrictions as to use of the packets and an application blank.

Management: Environmental improvement, marshes

Scott, Thos. G., and W. L. Dover. Blasting to improve wildlife environment in marshes, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 373-374, 2 pls.

Authors' abstract: "Marshes choked with rank growths of vegetation are a monotonous cover type subject to improvement by clearing operations, including the use of dynamite. The desired edge-effect and economical use of the explosive can be obtained by blasting ditches by the propagation method. The most successful excavations were made over hard pan sub-strata where the combined depths of soil and water above the hard pan did not exceed five feet. Charges were laid on a line at 18-inch intervals where there were less than 3 cartridges to a place, and at 24-inch intervals for heavier charges. As to depth, loads of one stick were used for 2.5 feet, 2 sticks for 3.5 feet, and 3 sticks for 4.5 feet of soil and water, respectively. The result of a properly placed blast was a ditch 9 to 12 feet wide of the desired length. Depth was limited by the hard pan. Excavations were attempted in deep, soft peat and muck with unsatisfactory results. It is probable that further experimentation will yield modification of the technique that will make it applicable to a variety of conditions."

Management: Farm game

Davison, Verne E. Better farming methods bring back wildlife, Virginia Wildlife (Virginia Commission of Game and Inland Fisheries, Blacksburg. 10 cents a copy), 4(1), Autumn 1940, pp. 16-20, 4 photos.

A pressing problem for wildlife conservationists is "that of finding effective measures of habitat improvement which are acceptable to the average farmer." To be acceptable they must accord with the interests of the farm family, add no economic burden, and harmonize with farm practices. In view of their respective connotations, the author prefers the expression producer-consumer to farmer-sportsman. He suggests interests that farmers have in wildlife and refers to efforts of the Soil Conservation Service to encourage agricultural methods that benefit game incidentally to improvement of farm management. The Soil Conservation Districts are widely adopting plans including wildlife measures and farm groups whose cooperation should be sought by those interested primarily in wildlife.

Management: Farm game

Hill, R. G., and G. W. Bradt. Producing wildlife by good farm land use, Extension Bul. Michigan State College (East Lansing), 218, 23 pp., illus., Dec. 1940.

Every farming activity influences wildlife and on account of the value of this life can well be modified to favor it. Suggestions are made as to the management of the farm wood lot, marshes, swales, and ponds, waste areas, cultivated fields, and windbreaks. Also discussed are the provision of food for wildlife, the control of hunting, and an educational program. The bulletin includes numerous references to allied publications and is copiously illustrated with excellent photographs.

Management: Farmer-sportsman relationship

Benjamin, J. R. State supervised hunting in Ohio in 1939, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 136, 19 pp., 4 figs., 15 tables (mimeographed), 1940.

Second annual report covering an area of 180,000 acres, and the activities of 6,819 hunters (not including farmers and their guests). Author's summary: "(1) After only two years of trial, supervised hunting has proved itself as a satisfactory method of solving the farmer-hunter problem. Regulated hunting is doing away with farmer-hunter friction by ostracizing the outlaw hunter. The farmer is obtaining the protection he is entitled to and the law-abiding hunter is finding a place where he can enjoy his hunt without fear of inadvertently trespassing if he merely stays within well-defined boundaries. In two years' experience with the supervised hunting plan, we have yet to hear of a single instance of property damage, livestock injury, or personal danger to any landowners or farm personnel. (2) The plan can and should be enlarged as rapidly as personnel can be trained to place new areas in operation. Old areas can be enlarged to help lessen hunting pressure, and new ones can be organized for demonstration purposes. (3) The plan should be safeguarded against the profit motive by the Conservation Division's insisting that those areas which charge for hunting limit their fees to just enough to pay the cost of operation. Any time any group starts operating for profit, the Division should withdraw all support from them; do no restocking, furnish no food patch seed, winter feed, area signs or permit tags, and refuse to commission their temporary game protectors and patrolmen. From all the information we can gather, the trend among the associations is to lower their rates in line with the Division's non-profit policy rather than to increase them. (4) It is absolutely requisite to the success of the plan that the hunting pressure be limited to what the game population will carry. The supervisor's first interest should be the game crop and its continued reproduction rather than the entertainment of a maximum number of hunters. A daily hunting pressure limit of not more than one hunter to thirty acres, should be rigidly enforced, and even a hunting pressure this dense should be kept as widely scattered as possible, to avoid possible danger. This limit must include farmers and their guests. The area seasons should be limited to that length which will permit only the harvest of the game surplus without cutting into next year's brood stock. This can be done either by shortening the area hunting season, limiting the number of hunters, by limiting the game bag, or by using all three control measures. (5) Supervised hunting may be modified in detail as necessity arises, but the general plan now in use in Ohio is the most satisfactory of any of the plans on which information has been obtained."

Management: Farmer-sportsman relationship

Bump, Gardiner. Unlocking the trespass gate, Outdoor America (1167 Merchandise Mart, Chicago, Ill. 10 cents a copy), 5(11), Sept. 1940, pp. 6-8, 2 photos.

Discussion of widely experienced difficulties in the farm hunting situation, and of the causes for failure of numerous attempts to relieve them. Tak-

ing these factors into consideration, the New York Conservation Department tried a new plan in 2 projects the first year which proved successful enough to encourage the addition of 5 others this season. These experiments involve the leasing by the State of hunting rights over sizeable acreages at 10 cents per acre, posting and patrolling also by the State, restocking and winter feeding in cooperation with sportsman's and 4-H clubs, furnishing seeds for feed patches and paying $10 per acre for putting them in. The total cost per acre averaged 32 cents, which, it is thought, can be reduced in other years and on larger acreages. Regulations under which hunting was permitted and requirements for the establishment of additional public hunting grounds of this type are reported.

Management: Feed patches

Mason, Edwin A. Wildlife food plants in New England, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 392-397.

Author's abstract. "Summary of experiments over a 5-year period with seed-producing plants for wildlife food strips at Groton, Massachusetts. It was found impossible to reliably mature sorghums, cowpeas, field corns, and hemp when sown broadcast in mixtures. Buckwheat, German, Japanese, and Proso millets, flax, soy bean, Sudan grass, sunflower, and Vicia sativa, have value for the purpose. Thin stands are desirable; 20 to 25 lbs. per acre is recommended. Adulteration of the seed mixtures with sawdust prior to sowing ensures more even stands. A combination of sunflower and Vicia sativa showed promise as a wildlife winter food mixture, as did also one of buckwheat and sunflower. The popcorn strains of Zea mays have much to offer as wildlife food plants. Tubers of Helianthus tuberosus freeze and spoil too quickly to be of value as a winter food. Observations pointed to 2 tree species, Catalpa catalpa and Cladrastris lutea, as possible wildlife food plants. Because of certain peculiar New England conditions, broadcast sowing experiments, although from a cultural standpoint less desirable, should be continued." Bibliography of 5 titles.

Management: Feed patches

[Stoddard, Herbert L.]. Fall combination plantings, Cooperative Quail Study Assoc. (Thomasville, Ga.), Management Leaflet 1, 6 pp. (mimeographed), Sept. 1940.

Mixed plants of Augusta Vetch, Wild Winter Pea, and fall grains have been found valuable in the Southeast in supplying food for quail and other game during the critical season of early spring. This leaflet describes the component plants, recommends the proportions in which their seeds should be used, and gives explicit directions as to inoculation of the legumes, rate of seeding, fertilization, planting, and maintenance.

A timely reminder that game management to a vital degree is plain dirt farming.

Management: Game cooperatives

Hill, Russell G. Some observations on farm game management cooperatives in Michigan, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 383-391, 2 charts, 3 tables.

Author's abstract: "Farm game management cooperatives have been in operation in Michigan for ten years with the State Department of Conservation assisting during the last four. During this period the number of organizations has increased from one in 1936 to 110 in 1939, involving 500,000 acres at a cost to the Department of about a cent per acre. Protest against local hunting trespass conditions stimulated the movement but game management is practiced and other far-reaching values result from these organizations. These cooperatives are farmer initiated and operated and great variation in the rules and regulations is found. In order to receive cooperation from the Conservation Department, certain requirements as to size of area, participation by farmers, and distribution of permits must be met. A small mortality of these cooperatives has resulted chiefly from lack of harmony between farm members, a fault that cannot be controlled by outside interests. Participation in this work by the Conservation Department and the Extension Division of Michigan State College is considered to be generally satisfactory to both farmers and city hunters."

Management: Harvesting squirrels

Chapman, Floyd B. The squirrel harvest on Ohio public hunting preserves, 1939, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 142, 8 pp., 1 fig., 5 tables (mimeographed), Aug. 1940.

Continuation of a series of reports on the subject that have been noticed in several previous issues of WILDLIFE REVIEW. New features are: addition of a privately-owned game management area to those under control; establishing checking stations at rural stores and at homes of fire wardens and other local residents; and paying a fee of 5 cents for each permit issued. Experience confirmed previous evidence of an approximate 5-year cycle in the numbers of gray squirrels which were again at a high level in 1939. A graph shows the number of hunters, number of squirrels seen, and the kill for each day of the open season. Tables summarize information on the number of hunters and of squirrels seen and killed on the 7 management areas; the kill per day and per thousand acres in each year since 1935; the sources of hunters visiting the controlled shooting grounds; and the gray squirrel-fox squirrel ratio on the 7 areas studied in 1939 (average 80 to 1). Bibliography of 23 titles.

Management: Harvesting statistics

Gordon, Seth. An analysis of methods used to collect game-kill statistics, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(8), Nov. 1940, pp. 4-5, 22-23, 30-31, 3 figs., 2 tables.

Sampling techniques and general observations of field workers give a fairly safe guide for procedure a season at a time. The game harvest may be even more accurately ascertained and the results, particularly over periods of years, are of inestimable value to the wildlife administrator. The methods used by 27 commonwealths, including states, territories, and Canadian provinces are briefed and the Pennsylvania system more fully expounded. After considerable experience, it was learned that simple hunter reports, promptly returnable under compulsion of a low penalty, delinquents being visited by wardens, resulted in practically complete returns. Other administrations are urged to adopt similar arrangements so that comparable statistics will become available. Tables show the Pennsylvania kill for 5-year periods since 1915, based chiefly on estimates, and for the last three years calculated from 93 to 98.5 percent complete reports.

Management: Herd regulation

Fredine, Gordon. Minnesota's deer problem, Conservation Volunteer (Minnesota Dept. of Conservation, State Office Bldg., St. Paul), 1(2), Nov. 1940, pp. 18-23.

Cutting of the hardwood forest enabled the white-tailed deer to extend their range and to increase, finally to such a number that they depleted their food supply. Counts from 1935 to 1939 showed that the animals have been gradually decreasing. The limiting factor is the carrying capacity of winter "yards" and more deaths are due to malnutrition than to hunting. Hunting can and should be used as a tool to control the deer population.

Management: Inventory, gannets

Fisher, James. The world's gannets, The Field (114 Fleet St., E. C. 4, London, England. One shilling a copy), 176(4575), Aug. 31, 1940, pp. 276-278, 5 photos, 1 map, 2 tables.

Location of colonies and numbers of these birds for the world in 1939; total 167,000. Information on the rookeries fullest for those about the Briti Isles.

Management: Inventory, pheasant

Hicks, Lawrence E., and Daniel L. Leedy. The 1940 September pheasant survey, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 145, 23 pp., 1 fig., 17 tables (mimeographed), 1940.

The technique of this population survey is described and the results discussed and tabulated from a number of points of view and summarized in the tables and in 30 brief paragraphs, indicative features of which are here furtl noticed. Average population per square mile, 91 (less than in 1938 and 1939); sex ratio of adults seen, 28.8 cocks : 71.2 hens; of juvenile birds, 46.6:53.4 of the entire population, 42.1% were cocks; mortality on highways 9.19, and or railroads, 360 birds per 1,000 miles; for every 100 pheasants there were seen also 14.1 bob-whites, 4 rabbits, 1.4 Hungarian partridges, 226 crows, and 7.9

hawks; favorite habitats were pasture, meadow stubble, and corn and soy bean fields; of 3,096 birds 30.6 percent were young; of 380 hens, 74.7 were with young; 444 broods averaged 5.6 individuals; average loss caused by mowing alfalfa fields, 46 nests, 40 pheasants killed, and 24 crippled per 100 acres. Bibliography of 24 titles.

Management: Planting for wildlife and erosion control

Davison, Verne E. Shrubs for wildlife on farms in the Southeast, U. S. Dept. Agr. Leaflet 200 (Supt. of Documents, Washington, D. C. 5 cents a copy), 7 pp. (unnumbered), 10 photos, 1940.

Putting shrubs in the right place or leaving them there is the first principle of their management on the farm. Wildlife borders, partly of shrubs, partly of herbs, are useful in separating forest and field and in preventing encroachment of woodland upon cultivated ground. Their construction and management are described. The use of shrubs for borders of tree plantations and for hedges is discussed. Waste areas on the farm as marshes, steep slopes, rock outcrops, and banks of streams and ditches can well be left in, or planted to, shrubs. The recommendations are made not only in the interest of wildlife but also in that of orderly and productive farming.

Management: Planting for wildlife and erosion control

Hawbecker, A. C. Planting for California wildlife, California Fish & Game (Terminal Island, Calif.), 26(3), July 1940 (rec'd. October), pp. 271-276, Figs. 100-103.

Food and cover plants essential to wildlife have been depleted in many areas but they can be restored to the advantage of both wildlife and soil conservation. An eroded farm near Watsonville, Calif., was planted and the California quail reintroduced. From 7, their number rose in two years to 47, without predator control and with some hunting. Other kinds of wildlife also were benefitted. The plants most successfully used, and animal species present on the farm before (12) and after (30) planting, are listed.

Management: Planting for wildlife and soil conservation

Anon. More abundant wildlife through the AAA program, U. S. Dept. of Agriculture, Agricultural Adjustment Administration (Washington, D. C.) General Information Series, G-100, folding circular, 6 pp., 7 photos, June 1940 (rec'd. August).

Notes on the interest and value of wildlife to farmers and the relation of soil conservation practices to wildlife. Payments are available to farmers for practices that help wildlife conservation under the 1940 program of the AAA, as follows: "(1) Farmers who plant, replant, cultivate, protect, and improve forest trees or mixtures of forest trees and shrubs suitable or beneficial for wildlife or for the protection of wildlife may be paid $3 to $7.50 per acre; (2) farmers who seed permanent grasses or permanent pasture mixtures under AAA specifications may be paid $3 per acre; (3) farmers who establish a

permanent vegetative cover by planting crowns of Kudzu may receive $6 per acre (4) farmers who allow nature to reseed noncrop open pasture by nongrazing during the normal pasture season under AAA specifications may receive $1.50 per acre." Other practices beneficial to wildlife, carried on under separate parts of the program, also are mentioned.

Management: Pond development

Osborn, Ben. Native plants stabilize pond shores, Soil Conservation (Supt. of Documents, Washington, D. C. 10 cents a copy), 6(6), Dec. 1940, pp. 144-145, 1 photo, 1 map.

By protecting native plants around a pond in Oklahoma for three seasons, the shores and inlet channel were completely stabilized. The only planting was sodding of the dam and spillway with Bermuda grass. The cover that developed is described. It attracted red-winged blackbirds, meadowlarks, mourning doves, and other birds.

Management: Squirrel, Gray

Goodrum, Phil. D. A population study of the gray squirrel in eastern Texas, Texas Agr. Expt. Sta. (College Station), Bul. 591, 34 pp., 5 figs., 6 tables, 1940.

The squirrel population has been reduced since about 1910 by overshooting and by the effects of lumbering. Methods found most effective in estimating numbers of the animals were: "(1) Time-area counts of the number of squirrels on sample plots selected at random over the tract to be censused; (2) counting leaf and twig nests on a given strip of forest cover of different types, preferably in late fall and early winter; (3) hunting with a dog." The nest count method recommended as practicable for game management purposes. Summaries of counts made in different types of habitat are tabulated and the carrying capacity shown to be highest in hammocks or loamy ridges on flood plains. Average populations varied from 1.14 to 1.34 squirrels per acre. Life history, including food habits, and local movements are discussed in relation to management. The animals breed throughout the year, hence any shooting season will coincide to some extent with the reproductive period. The young remain in vulnerable groups for about 4-1/2 months. Unrestricted timber cutting, overgrazing, and drainage, all have contributed to the reduction of the numbers of squirrels. Suggestions are made for modification of each of these activities that will improve conditions for squirrels. The population can be approximately doubled. Bibliography of 22 titles.

Management: Stocking, cottontail

Cramer, Wilbur M. Pennsylvania's rabbit transfer program, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(7), Oct. 1940, pp. 6-7, 27, 5 figs.

Continuation of an article of same title abstracted in WILDLIFE REVIEW No. 28, August 1940, p. 36. This installment relates mainly to the trapping

rabbits in parks, and upon institutional and other grounds where hunting is not permitted; animals are also taken from nurseries, truck gardens, and other places where they do damage. The most dependable sources, however, are auxiliary game refuges. A tabulation of the head of game trapped on one of the most productive areas shows that 5,884 rabbits and 1,588 pheasants were removed in 8 years. In the fiscal year 1939-40, more than 30,000 cottontails were trapped and redistributed at a cost of about 50 cents each. The number taken from various areas and the acreage per rabbit removed are recorded in a table; acres per rabbit varied from 0.35 to 2.35.

Management: Turkey

Mosby, Henry S. Restoring the wild turkey in Virginia, Virginia Wildlife (Virginia Commission of Game and Inland Fisheries, Blacksburg. 10 cents a copy), 4(1), Autumn 1940, pp. 11-15, 1 photo.

Notes on the history of the wild turkey; the bird received no effective protection until 1916. The species still occurs in 69 of the 100 counties, to the total number of about 23,000 in 1937. Restocking with purchased stock proving ineffective, the Commission set out to develop a satisfactory procedure. Elements of it are mating of selected brood hens with native wild gobblers and releasing birds four months of age in groups of 15-20. Fifty percent survival is considered satisfactory. The propagated birds are liberated on unoccupied territory; for the older range, improved management and adequate protection are relied upon to keep up the stock. Education is the only hope for conservation.

Natural History: Birds of Ohio

Rorimer, Irene T. A field key to our common birds, Cleveland Mus. Nat. Hist., Pocket Natural History No. 8 (Cleveland, Ohio. $1.50 a copy), 158 pp. (4-1/4 x 6-3/4), 19 pls. (4 col.), 28 figs., Nov. 1940.

Relating especially to the common birds of northern Ohio, but of broader application, this pocket manual includes keys, illustrations, and descriptions, and also remarks on status and habitat. An appendix comments on uncommon species grouped according to the environments in which they are most likely to be seen.

Natural History: Birds of Texas

Burleigh, Thomas D., and George H. Lowery, Jr. Birds of the Guadelupe Mountain region of western Texas, Louisiana State University (University, La.) Occasional Papers, 8, Aug. 1940, pp. 85-151, 4 pls., 1 map.

General description of the region and of the field work reported and annotated list of 177 forms of birds.

Natural History: Cacti of Arizona

Benson, Lyman, J. J. Thornber, A. A. Nichol, and Lucretia B. Hamilton The cacti of Arizona, University of Arizona, Biol. Sci. Bul. 4 (Tucson, Ariz. $1.00 a copy), 134 pp., 52 pls. (including several in natural colors and numberous bicolored distribution maps), 1940.

A wonderfully good publication on a group of plants for a State, excellently presented and effectively illustrated. It includes all general information, keys and illustrations necessary for identification of the 80 species native to Arizona, gives description, statement of range, and remarks for each form, and contains a section on the culture and care of cacti.

Natural History: Mammals of Texas

Davis, Wm. B. Mammals of the Guadalupe Mountains of western Texas, Louisiana State University (University, La.) Occasional Papers, 7, July 1940, pp. 69-84, 1 map.

Notes on vegetation and physical features of the region. Annotated list of 32 forms of mammals.

Natural History: Wildrice

Chambliss, Charles E. The botany and history of Zizania aquatica L. ("wild rice"), Journ. Washington Acad. Sci. (Wm. P. Diehl, U. S. Bureau of Plant Industry, Washington, D. C. 50 cents a copy), 30(5), May 15, 1940, pp. 185-205, 6 figs. (photos).

Utilization of wildrice by wildlife is given all the mention that might be expected in a popular general account of the plant which covers vernacular names, early records, distribution, structure, life history, and harvesting, and recites some of the Indian lore about the plant.

Predation: "Vermin" problem

Netting, M. Graham. Reptiles killed on a "vermin" campaign in Mercer County, West Virginia, Proc. W. Va. Acad. Sci. (Charleston), 13, 1939, pp. 162-166.

Identification of 1 species of lizard and 5 of snakes from 37 specimens upon which bounties had been paid. Discussion of the food habits and economic values of the forms and a plea for "vermin" campaigners "to stay their hands from those species of animals that serve as insect and rodent controls."

Predators: In Canadian national parks

Halliday, W. E. D. Nature's wise law of survival, Forest & Outdoors (610 Canada Cement Bldg., Montreal, Canada), 36(10), Oct. 1940, pp. 317-318, 324, 326, 329.

Principally an exposition of changing policies toward predators in Canadian national parks. At first wolves and bears were specified for control in legislation; then interest in the preservation of the grazing animals became predominant and all the larger predators were combatted by a variety of methods; more recently policy has come into "general agreement with that officially stated by the United States Government for the National Parks Service. It is recognized that these animals are part of a well-defined scheme of relationships between all forms of wild life, and that they provide a natural and necessary check on the abnormal increase of other forms, especially on the surplus population of herbivorous animals. It is believed that the ultimate good of animal populations protected from man is best obtained by, in general, non-interference with the natural struggle for existence. It is also felt that the handling of wild life on the principles applicable to domestic livestock is to be avoided. It is fully appreciated that a certain degree of control may be necessary from time to time, for protection of property, domestic herds, human life, or to aid an animal species in danger of extermination. Such control, however, must be flexible, and easily adjusted to varying needs." Each of the principal predators in Canadian national parks is briefly discussed and in no case is systematic control at present deemed necessary. Instructions to wardens on this point are quoted in illustration of the official policy.

Propagation: Feeding pheasants

Skoglund, Winthrop C. Self selection of fall and winter foods by ringneck pheasants, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(7), Oct. 1940, pp. 14-15, 28, 3 photos, 5 tables.

Comparison of the results of feeding a definite grain-mixture and of a free-choice ration of the same materials plus soy beans. Birds allowed to regulate their own diet ate the soy beans well and took the ingredients of the grain mixture in proportions different from those of the standard mixture. However, slightly better results, as measured by growth, feed consumption, and efficiency, were obtained with birds fed the recommended diet.

Propagation: Feeding young pheasants

Skoglund, Winthrop C. An improved ration for starting ring-necked pheasants, Pennsylvania State College, Expt. Sta. (State College) Bul. 389, 22 pp., 4 figs., 13 tables.

Abstract of previous research as to protein requirements of young birds. Neglect in feeding results in losses from perosis (slipped tendons). The history of prevention of this difficulty in young chickens is reviewed and the work upon pheasants recounted. Of 10 starting rations experimented with, one containing soy bean oil meal as the major source of protein was found satisfactory and practicable. Its formula is given in full. Bibliography of 31 titles.

Propagation: Hybrids

Hachisuka, -------. The hybrid pheasants, Modern Game Breeding (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa. 25 cents a copy), 10(8), Aug. 1940, pp. 6-7, 10-11, 2 photos.

Notes on the following crosses: Guinea fowl X domestic fowl; guinea fowl X peafowl; vulturine X common guinea fowl; common pheasant X turkey; Indian X green peafowl; peafowl X domestic fowl; golden X Lady Amherst pheasant; golden X common pheasant; Reeves' X common pheasant; kaleege pheasant hybrids (several); and the Manchurian X blue eared pheasant;

Research: Animal containers

Bissonnette, Thomas H., and Earl E. Bailey. Den and runway system for weasels and other small mammals in the laboratory, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 24(3), Nov. 1940, pp. 761-763, 1 fig.

Description and illustration of cages and runs adapted to hold small, quick animals that escape at the slightest opportunity. The containers are built to use in series and to be moved about on castered supports.

Research: Mammal

Hamilton, W. J., Jr. Mammal life of the forest floor, Bul. New York Zoological Society (Publication Office, Zoological Park, New York, N. Y. 35 cents a copy), 43(6), Nov.-Dec. 1940, pp. 171-180, 12 illus.

Interesting popular article on the environment and its mole, shrew, and mouse inhabitants, intended as an encouragement to their study.

Research: Marking animals

Keeler, Clyde E. Tatoo [sic] punch for numbering rats, Science (Lancaster, Pa. 15 cents a copy), 92(2383), Aug. 30, 1940, pp. 205-206, 2 figs.

Illustration of home-made punch and description of its use; capacity up to a million numbers.

Research: Marking animals

Trippensee, R. E. A new type of bird and mammal marker, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(1), Jan. 1941, pp. 120-124, 1 pl., 2 tables.

Author's abstract: "Pyralin markers obtainable in nine colors may be fastened to the tail-feathers of birds and the ears of small mammals. The purpose of the markers is to distinguish individuals so as to facilitate observations on them without trapping. The colors found most effective are white,

black, yellow, maroon, orange, red, cerise, dark-green, light-blue, and dark-blue. Seventy-two different color combinations can be made from available material. Different-sized markers are used for pheasants, ruffed grouse, songbirds, rabbits, and squirrels. Marked snowshoe hares have been distinguished up to 60 feet and pheasants up to 300 feet. The method of using the markers is described and a summary of their limitations is given." Bibliography of 8 titles.

Research: Methods of analyzing feces

Swanson, Gustav. Food habits of the sharp-tailed grouse by analysis of droppings, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 432-436, 1 table.

Author's abstract: "The analysis of droppings as a method of determining food habits of gallinaceous birds deserves wider application, although it has a tendency to exaggerate the importance of the harder items. Review of the chief literature on food habits of the carnivorous mammals determined by this method reveals a lack of uniformity in presentation of data. It is suggested that frequency of occurrence, volumetric data, and number of prey individuals should all be presented wherever possible to facilitate comparison with other studies. All published reports upon the autumn and winter foods of the sharp-tailed grouse reveal that the diet is relatively simple."

The leading 3 food items by volume in 550 droppings were bearberries, rose hips, and wild buckwheat.

Research: Trapping squirrels

Baumgartner, Luther L. Trapping, handling, and marking fox squirrels, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(4), Oct. 1940, pp. 444-450, 1 pl., 16 figs.

Description and illustrations of the trap found most efficient in the capturing alive of some 1,100 fox squirrels; also similar material with reference to a handling cage. Instructions for trapping squirrels and marking them by tags and by toe clipping.

WILDLIFE LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C.

BS-164. Research in the administration of Federal refuges, by E. R. Kalmbach, 7 pp., June 1940.

Calls attention to Federal obligations imposed by treaties and legislation for the protection of waterfowl and to the desirability of research as a basis for management. Allusion is made to studies of aquatic plants but most of the leaflet is devoted to an account of work with predators in relation to nesting waterfowl. Control as thus far carried on is regarded as part of the experimental work and the policy of doing the least necessary to optimum production of the protected birds is recommended.

170. The annual fur catch of the United States, 21 pp., 40 tables, October 1940.

Compilation of data of varying degrees of completeness from Alaska and 39 States, in most instances representing more than one year.

172. Suggestions for combating objectionable roosts of birds with special reference to those of starlings, by E. R. Kalmbach, 18 pp., 1 pl., December 1940.

History and status of the starling in America; description of its roosting habits, their objectionable features, and means of control, including screening, eliminating roosting ledges, trimming trees, and frightening the birds, and also shooting, trapping, gassing, and poisoning. Six references to cognate articles. Supersedes BS-81, issued in 1937.

174. Abstract of fur laws, 1940-41, compiled by Frank G. Grimes, 39 pp., October 1940.

Open seasons, and the stipulations regarding possession and sale, shipment and export, and licenses for taking furs and fur animals are set forth for Alaska, Canadian Provinces, and the United States. The application of the Federal Lacey Act to interstate shipments also is explained.

BS-175. Big-game inventory of the United States, 1939, 11 pp., 17 tables, November 1940.

Tabulations for 13 species according to States, for 15 according to the ownership or control of their ranges, and summary for 14 species. Total nearly six millions.

NOTES AND NEWS

On October 12, 1940, plenipotentiaries of six Latin American governments and the United States signed the convention on "Nature Protection and Wildlife Preservation in the Western Hemisphere" when it was deposited and opened for signature at the Pan American Union in Washington.

The Convention was drawn up by a Committee of Experts from the 21 American Republics, which met in Washington May 13 to 16, and was approved by the Governing Board of the Pan American Union at its June meeting. The formulation of the Convention was recommended in one of the resolutions of the Eighth Pan American Conference, held at Lima, Peru, in December, 1938.

The Convention consists of twelve articles. Article 1 defines the terms used in the Convention. Under Article 2, the contracting governments undertake to create national parks, national reserves, nature monuments, and wilderness reserves within their territories as soon as possible. They are to notify the Pan American Union of the establishment of any such parks, etc., and of any legislation adopted in connection therewith. Under Article 3, the governments agree to prohibit the destruction of the fauna and flora in national parks except under the direction or control of the proper authorities. Wilderness reserves, according to Article 4, are to be kept inviolate except for duly authorized scientific investigations or government inspection.

Under Article 5, the governments pledge themselves to adopt legislation which will assure the protection and preservation of the natural scenery, striking geological formations, and regions and natural objects of aesthetic interest or historic or scientific value. Cooperation among the contracting governments in promoting the objectives of the Convention is provided for in Article 6, and the adoption of appropriate measures for the protection of migratory birds, in Article 7.

Article 8 declares the protection of certain species to be of special urgency and importance and urges that permission for their killing, capturing or taking, be granted only in order to further scientific purposes. Rules for the regulation of the importation, exportation and transit of protected flora and fauna are set forth in Article 9. Articles 10, 11, and 12 deal with protocolary matters, and stipulate, among other things, that the Convention will come into force three months after the deposit of not less than five ratifications with the Pan American Union.

An article by Harold J. Coolidge, Jr., bearing on the treaty may be found in Science, 92(2394), Nov. 15, 1940, pp. 458-460.

The reports on wildlife surveys made by the Colorado Game and Fish Commission (Denver), while administrative in function and to a considerable extent in content, nevertheless, treat numbers, range, life-history, food habits, and relations to man and to predators to such an extent that they are valuable for reference. Those reaching WILDLIFE REVIEW relate to the beaver (2 vols.), antelope, deer and elk (2 vols.), and sage grouse (all mimeographed).

Proceedings of the Second Minnesota Wildlife Conservation Short Course (Minnesota Wildlife Federation, Minneapolis), 70 pp. (mimeographed), 1940. Introduction and briefs of 18 papers presented during the course under the leadership of Gustav Swanson. Those coming within the scope of WILDLIFE REVIEW are here briefly abstracted.

Lincoln, Frederick C. Management of migratory waterfowl, pp. 3-6. Causes and progress in the decline of waterfowl; improved regulation of hunting and a vast refuge program, under more favorable climatic conditions reversed the trend and in 5 years resulted in doubling of the numbers of the birds.

Stoudt, Jerome. The waterfowl population in the Chippewa National Forest, pp. 6-9.

Summary of censuses for 3 years 1937-9; the number of ducks fluctuated in proportion to the total length of shoreline which was controlled by water levels at a dam. Total populations of the Forest for the years noted and the proportions composed of various species are estimated (mallard, blue-winged teal, and golden-eye most common). Breeding areas are much understocked. The kill was greater than the total breeding population each year--2-1/2 times as great in 1939. Additional protection has been given by the establishment of 7 refuges totaling 8,700 acres (3 percent of the water area of the Forest).

Gigstead, Gill. Homes for tree-nesting ducks, pp. 9-11.

Nest boxes have been well accepted by wood ducks in Illinois and golden eyes in Minnesota. Directions are given for building and placing the houses. The numbers of tree-nesting ducks may have been greatly affected by lumbering operations.

Nagel, Werner O. The chukar partridge and other introduced game birds, pp. 12-13.

Of 86 species and subspecies of birds introduced from 1870 to 1930, only 5 became well established. Two of these were game birds, the Hungarian partridge and ring-necked pheasant. Game-farm production of these birds for shooting is impossibly expensive, so in the long run they must be managed on the same basis as native game. Ecological studies should be relied upon as a guide to satisfactory areas for stocking. Studies in Missouri indicate that the State has no range upon which it appears likely that chukars will set up a stable, general, and self-supporting population.

Aldous, Shaler E. The beaver in Minnesota--a resource and a responsibility, pp. 14-17.

After great depletion, beavers, under protection, increased generally i the northern part of their range. In Minnesota, despite poaching, their population grew until in 1939 an open season was permitted, in which some 11,000 o the animals were taken. Suggestions are made as to improving the season with view to maintaining the population and providing a regular crop of from 5 to 8 thousand pelts. The life-history, with special emphasis on food habits, is sketched and 9 questions about beavers much in need of adequate answers are propounded. The answers are needed as a basis for progressive management.

Swanson, Gustav. Pheasant management in Minnesota, pp. 17-20.

Though the pheasant has been very successful in the State, need for improved management arises from the steadily increasing number of hunters. A dependable census is a requirement for good management. Methods of enumeratin the birds are described and management suggestions are made.

Moyle, John B. Planting aquatic plants in Minnesota lakes and streams, pp. 29-32.

As a direct food resource for ducks and geese and as an indirect one fo fishes. The main factors influencing the distribution and abundance of aquati plants are: The chemical quality of the water; the physical nature of the bod of water; the type of bottom soil; the abundance of plankton; and the effects

of feeding by animals. Plants are named that are suited to waters of 3 different degrees of "hardness" and of 5 combinations of these types. Similar suggestions are made also with respect to the other limiting factors. The environmental qualifications that should be ascertained in pre-planting surveys are listed.

Hatfield, D. M. Minnesota fur-bearers--an undeveloped asset, pp. 32-36.
On about 40 percent of Minnesota's land that is unsuitable for agriculture, income from fur is, or can be made, important. The chief fur animals, and their distribution, abundance, and values are discussed and examples of income from trapping and sale of furs are cited. The net effect of the food habits of fur-bearers is held to be beneficial to farmers and sportsmen alike. Research as a basis for management is needed and desirable investigations are pointed out. It may well be supported by the fur industry. Trappers should be educated and poachers controlled.

Fredine, Gordon. Minnesota's deer problem, pp. 36-42, 2 tables.
See abstract on page 46 of this issue of WILDLIFE REVIEW.

Fenstermacher, R. Autopsy findings of deer, pp. 42-43.
Summary of 102 autopsies as to the finding of bacteria, ecto- and endoparasites, and as to mechanical injuries and other causes of death, including malnutrition.

King, Ralph T. Upland game--its future and management, pp. 55-62.
The period of settlement, bringing great interspersion of clearings, croplands, and forests, and multiplication of "edge" environment, was also one of great increase in farm game. Then more intensive farming, growth in the number of hunters, and increase in accessibility to game environments, brought on depletion. New methods of treating wildlife are necessary, including possibly restrictive, and certainly productive, measures, that is, management. Wildlife reproduction is so exuberant that almost any efforts at management are rewarded. They are most effective when guided by the requirements of the species involved, particularly in the breeding season. Attention to year-round needs is, however, necessary. Provision of food and cover in proper relationship, inventory of stock, and restriction of the kill to surpluses, are essential. Much restocking is wasted because nothing can be gained by adding game to a range which cannot support that already present.

King, Ralph T. The sportsman's part in conservation, pp. 63-70.
Conservation is defined as use guaranteeing maintenance. Conservation of wildlife requires maintenance of productive environments. It is justified by commercial, recreational, biological, social, esthetic, and scientific, values which are exemplified. Due to the variety of these values, many groups of people are interested and are entitled to share in conservation management. The proper role of the sportsman is discussed at some length and summarized in the following paragraph:

He should: "(1) Recognize and appreciate the rights and interests of all other conservation minded groups and keep constantly in mind the various values possessed by and services performed by our wealth of wild species; (2)

distinguish between policy and program; decide matters of policy but leave matters of program to those charged with the responsibility of carrying it out; (3) foster and promote management by devising some means of compensating the landowner for his investment in management; (4) recognize and appreciate the landowner's position and enforce this same recognition and appreciation on the part of his fellow sportsmen; (5) take the steps necessary to insure the proper utilization of wildlife; (6) aid in the production of wildlife by accepting proven practices and seeing that they are properly applied."

The annual report of the Ohio Wildlife Research Station (Ohio State University, Columbus, 14 pp. mimeographed, 1940) for the fiscal year 1939-40 lists the staff, substations, and students, explains the work in progress and that finished, and records the positions held by 28 men formerly associated with the station, 27 of whom are employed in the field for which trained.

In the October, 1940, issue of Timely Turf Topics of the United States Golf Association Green Section (Box 73, Benjamin Franklin Station, Washington, D. C.) is discussion of possible injury to birds from arsenical poisoning of turf pests. From its experience, which is summarized, the Green Section concludes that arsenical treatments of turf can be carried on without introducing any menace to the bird population.

There has been a tendency for the issues of WILDLIFE REVIEW to appear with less frequency but to contain more numerous abstracts. This appears from the subjoined table.

Years	Number of issues	Average number of abstracts per issue*
1935-36	7	89.4
1937-38	11	91.5
1939	7	112.0
1940	3	157.0

*Excluding indexes

Convenience has in part influenced this trend but the compiler will be glad to learn the views of readers as to whether larger and less frequent, or smaller and more frequent, issues are desirable.

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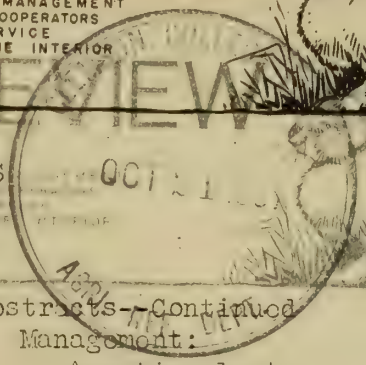
WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE FISH AND WILDLIFE SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

WILDLIFE REVIEW



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Washington, D. C. No. 30 March, 1941

Bibliography: Conservation education

Anderson, Ellen L., and Effie G. Bathurst. Good references for conservation education in secondary schools, U. S. Office of Education (Federal Security Agency, Washington, D. C.), Bibliography No. 55, 14 pp. (3 x 8-3/8), 1938.

References to: Basic materials for instruction, as to factual background and methods of teaching; and sources of supplementary materials, including visual and auditory aids, and bulletins and periodicals.

Bibliography: Conservation education

Bathurst, Effie G., and Ellen L. Anderson. Good references for conservation education in elementary schools, U. S. Office of Education (Federal Security Agency, Washington, D. C.), Bibliography No. 70, 14 pp. (3 x 8-3/8), 1938.

Contents organized under the same heads as those of the preceding entry.

Bibliography: Conservation education

Bathurst, Effie G., and Ellen L. Anderson. Good references on conservation of birds, animals, and wild flowers for use in elementary schools, U. S. Office of Education (Federal Security Agency, Washington, D. C.), Bibliography No. 72, 9 pp. (3 x 8-3/8), 1938.

Materials for children are classed as noted in the title; a later section refers to materials for teachers.

Others of the Bibliography series that may be of use in our field are Nos: 32, Visual aids in education: Motion pictures; 33, Visual aids in education: Lantern slides, film strips, etc.; and 34, Pictures, maps, charts, etc.

Classification: Bighorns

Cowan, Ian McTaggart. Distribution and variation in the native sheep of North America, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 24(3), Nov. 1940, pp. 505-580, 4 pls., 1 map, 24 tables.

Besides fully discussing its special subject, the nature and extent of variation in the bighorns, this outstanding paper is a revision of the American species. Synonomy with exhaustive references is a feature. Location and full data for the type of each form are given, as well as statements of range, measurements, weights, and descriptive and comparative notes. Two species with ten races are recognized, of which one is apparently extinct. Bibliography of 6 pages.

Conservation: Aims

Gabrielson, Ira N. Planning for wildlife restoration, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 12-19.

Abstracted from the Maryland Conservationist in WILDLIFE REVIEW, No. 28, August 1940, p. 3.

Conservation: Game

Bennett, Logan J. Recuperating Americans, American Forests (919 Seventeenth St., Washington, D. C. 35 cents a copy), 47(1), Jan. 1941, pp. 10-12, 48, 2 photos, 1 graph.

Review of former and present statuses of several game species. The same set of facts create pessimism in some minds, optimism in others. This author is of the latter persuasion. The implication that Migratory Bird Hunting Stamp funds have been of dominating importance in recent acquisition of lands for Federal refuge purposes is incorrect. Through the fiscal years 1935-39 they amounted to about 10 percent of the total funds available, and have been used more for development than for acquisition of refuge areas.

Conservation: Hawks and owls

Fox, Adrian C. Our friends--the hawks and owls, Dakota Farmer (Aberdeen, S. Dak.), Dec. 28, 1940, p. 508, 1 photo.

Popular article to the effect that there are "good" hawks as well as "bad", urging a more considerate view of the group and protection of the more beneficial kinds.

Conservation: Nature reserves

Shelford, V. E. List of reserves that may serve as nature sanctuaries of national and international importance, in Canada, the United States, and Mexico, Ecology (Prince & Lemon Sts., Lancaster, Pa. $1.50 a copy), 22(1), Jan. 1941, pp. 100-110, 2 maps.

This paper, which urges the setting aside of areas extensive enough to preserve their natural features, including the large mammals, contains discussions of predatory animals and their control, and of buffer zones to protect existing reservations from change. The main body of the article consists of suggestions relating to 81 areas in Canada and the United States that it is desirable to preserve in natural condition. An annotated list of present and proposed similar areas in Mexico also is given.

Control: Bird damage

Kalmbach, E. R., and Johnson A. Neff. Bird control: A statement of Federal policies with a suggested method of approach, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 195-199.

Reference is made to a statement of policies published in 1932, and the point emphasized that no marked change in them is proposed. This paper sketches the procedure in investigation of reported damage and in demonstration of any relief measures found necessary. Both defensive and aggressive methods are mentioned and the desirability of avoiding damage by modification of agricultural practice is pointed out. Approach must be impartial; real grievances against birds must be honestly met; and necessary control must be carried out safely, economically, legally, and in a manner acceptable to public opinion. The practicability of alteration of farm practice requires close attention to each individual case but also a broad program of cooperation and research participated in by all parties at interest.

Control: Fish-eating birds

Pough, Richard H. The fish-eating bird problem at the fish hatcheries of the Northeast, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 203-206.

As a result of field observation and correspondence, thirty kinds of birds were definitely implicated in damage at hatcheries and a dozen or so additional were found to be under suspicion. The belted kingfisher, great blue heron, black-crowned night-heron, and osprey were the subjects of most frequent complaint. At only about a dozen out of 260 establishments was screening installed that was adequate to exclude all fish-eating birds. All others relied on killing the birds, usually in disregard of law. In nine States, about 5,000 kingfishers, and 1,000 great blue, and 1,300 night, herons had been killed in a year. There is good evidence that the "controlled" species are decreasing in numbers. The author believes that excluding measures are completely feasible, and that they can be adopted at an ultimate profit to the fish culturist and always at a profit to the public.

Control: Prickly pear

Ramsley, Francis. Control of prickly pear in Australia, Science (Lancaster, Pa. 15 cents a copy), 92(2397), Dec. 6, 1940, pp. 528-529.

Review of an official report. The most effective method of control has been introduction of insects that feed upon cactus. Prickly-pear infestation has been reduced 75 to 95 percent of what it was in 1925. The great bulk of former prickly-pear territory is now reclaimed and it is believed will never revert to its previous useless state.

Control: Rabbit, European

Middleton, A. D. The control and extermination of wild rabbits, Bureau of Animal Population, Oxford University (Oxford, England), 27 pp., 3 figs., Sept. 1940.

The usual unorganized efforts at control are unsatisfactory because they rarely reduce the animals below a level from which they can recover in a single season. Moreover it is usually postponed so late that much damage is done that could be prevented if the rabbits were killed down in early fall. Where rabbits are numerous, their market value will compensate for part or even the whole cost of control. The various methods of combatting the animals are mentioned, and of them, trapping and cyanide gassing are recommended. Both of these and other methods are fully described.

Cycles

Hatfield, Donald M. Animal populations and sunspot cycles, Chicago Naturalist (Chicago Academy of Sciences, Chicago, Ill.), 3(4), Dec. 1940, pp. 105-110, 1 fig.

Review of recent literature (6 titles cited), mention of species known to exhibit cyclic fluctuations, and discussion of theories on the subject. The answer to the question, "What causes cycles?" rests upon future investigations.

Cycles: Arctic animals

Chitty, Dennis. Canadian Arctic wild life enquiry, 1938-39, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 9(2), Nov. 1940, pp. 227-242, 4 figs., tables.

Fourth annual report on this inquiry into fluctuations of lemmings, arctic foxes, and snowy owls, and into diseases of sledge dogs. The methods employed are described and the results tabulated and mapped. This report notes that: lemmings have decreased nearly everywhere in the Eastern Arctic; arctic foxes declined sharply in the same region after two years of fairly general increase, in the West fox populations increased; snowy owls decreased except in northern Labrador and north-west of Hudson Bay.

Destruction: By arsenical baits

Lilly, John H. The effect of arsenical grasshopper poisons upon pheasants, Journ. Economic Entomology (E. H. Cory, College Park, Md. 75 cents a copy), 33(3), June 1940, pp. 501-505, 1 fig., 2 tables.

Review of literature (4 titles cited) and report upon experimental feedings of poisoned baits and of grasshoppers dead or dying from eating such baits. The details of the experiments, changes in weight of the birds, and results of chemical analyses of two of the experimental birds are tabulated. Author's

summary: "Young pheasants in nature are apparently not menaced directly by arsenical baits as they are commonly recommended and used. Not only are the baits spread too thinly to make them readily available but even the better ones are decidedly unpalatable to these birds. Caged pheasants consumed grasshoppers dead and dying as a result of eating arsenical baits almost as readily as they did unpoisoned grasshoppers, and there are no indications that they will not do so in nature. A young pheasant that had eaten comparatively large quantities of the U. S. D. A. standard bait and another one fed exclusively on poisoned grasshoppers for a period of 12 days showed no gross pathological symptoms when autopsied, and neither of them retained significant quantities of arsenic in the body tissues subsequently analyzed. The results presented here indicate that grasshopper poisoning campaigns are not an important menace to young ringneck pheasant or to individuals [persons] who may eventually consume birds so exposed."

Destruction: Crippling losses

Nelson, Urban C., and Gustav Swanson. Losses of crippled game birds, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 1(6), March 1941, pp. 44-48, 2 tables.

Losses of ducks varying from 11 to 54 percent, and of pheasants, from 6 to 48 percent, are discussed according to types of shooting and experience of hunters. The value of dogs in reducing such losses is distinctly indicated. Suggestions are made as to hunter action to improve the situation.

Diseases and Parasites: Acanthocephala

Van Cleave, Harley J. Relationships of the Acanthocephala, American Naturalist (Science Press, Lancaster, Pa. $1.00 a copy), 75(756), Jan.-Feb. 1941, pp. 31-47.

History of study of the group, discussion of characters and relationships. Author's summary: "In conclusion, a review of the evidence gives ample proof that the Acanthocephala have little in common with the Nematoda. The grouping of Acanthocephala with any of the various aggregation of animals that have been proposed lacks convincing evidence of natural grouping based on common origin. Only with the Cestoda are impelling evidences of relationship traceable, but these are of a degree denoting long separation. It seems clear that recognition of Acanthocephala as an independent phylum best measures the extent of isolation of this group. In allocating this phylum it should be placed immediately adjacent to the Plathelminthes in recognition of the many points held in common by Acanthocephala and Cestoda." Bibliography of 19 title

Diseases and Parasites: Bacterial diseases of birds

Carpenter, Cliff D., Chairman. Poultry diseases, Journ. Amer. Vet. Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 97(764), Nov. 1940, pp. 510-526.

This report, devoted to bacterial diseases, includes their names in various languages, the scientific appellations of the causative organisms, and of the bird hosts, both vernacular and scientific names being given for wild species. Index numbers refer to the published articles dealing with the various diseases (30 in number) which are listed in a bibliography of 189 titles.

Diseases and Parasites: Bird malaria

Hewitt, Redginal. Bird malaria (The Johns Hopkins Press, Baltimore, Md. $1.10 a copy), xvii+228 pp., 15 pls., 33 figs., 22 tables, 1940.

Surprisingly, more than 500 titles bearing on bird malaria are cited; they are provided with a classified index, and their contents, of course, assimilated in the text, which seems complete and satisfactory in every respect. Avian malaria occurs in all parts of the world and has been identified in some 170 species which are listed. Incidence, as revealed by blood smears, averaged 5.8 percent in nearly 7,000 individual birds. Thirty-one nominal species of Plasmodium from birds are listed and a key given for identification of 14 of the better understood forms. The book treats also the discovery and history of bird malaria, experimental hosts and methods, characteristics of laboratory infections, symptomatology and pathology, immune reactions, effects of drugs on infections, mosquito transmission, and stages in the life cycle of the parasites.

Diseases and Parasites: Bird vectors

Clapham, Phyllis A. On wild birds as transmitters of helminth parasites to domestic stock, Journ. Helminthology (Institute of Agricultural Parasitology, St. Albans, England. 7 shillings 6 pence a copy), 18(1), March 1940, pp. 39-44.

Review of literature (5 titles cited). Starlings probably play a part in transmitting gapeworms, not directly, but by infecting intermediate hosts. The author made a study of the relation of wild birds to several helminth parasites of poultry and reports the rook and starling as probable transmitting agents.

Diseases and Parasites: Botulism

Fried, Louis A. Duck sickness in Minnesota, Conservation Volunteer, (Minnesota Dept. of Conservation, St. Paul), 1(5), Feb. 1941, pp. 48-51.

Brief history of the disease in more western states and of previous studies in Minnesota. Report on recent outbreaks in that State, in particular one in Grant County in 1940. Green algae were excessively abundant and in decaying masses of them the botulinus toxin was determined. 580 dead and sick birds were found and of 119 affected individuals collected, only 14 responded to treatment and survived. Fifteen species were represented. The frightening devices used to scare birds away from the lakes are described; they were very effective. 98 percent of the birds examined were birds of the year.

Diseases and Parasites: Dutch elm disease

Brewer, E. G. The fight for the elms, American Forests (919 Seventeenth St., Washington, D. C. 35 cents a copy), 47(1), Jan. 1941, pp. 22-25, 4 maps, 1 table.

This disease has been known in this country for 11 years and has been identified in about 61,000 trees. Incidence seems to be decreasing and hope for eradication of the malady is not unreasonable provided the control campaign undergoes no relaxation.

Diseases and Parasites: Eelgrass

Cottam, Clarence. The eelgrass situation, Fall 1940, Plant Disease Reporter (U. S. Bureau of Plant Industry, Washington, D. C.), 25(2), Feb. 1941, pp. 46-52 (mimeographed).

General notes on the plant, its utility to wildlife and to man, and past periods of scarcity, with a report summarizing conditions as observed during the past two years. In general, improvement has been most marked in waters of lower salinities. The plant is perhaps only 10 percent as abundant as it was before the present period of depletion. Details are given for several sections of the Atlantic Coast.

Diseases and Parasites: Nematoda, Onchocerca

De Nio, Reginald M., and Raymond H. West. The foot-worm disease in deer of the northern Rocky Mountain region, U. S. Forest Service Region One (Missoula, Mont.) Field Notes on Wildlife, 2(6), Feb. 1941, 4 pp., 1 pl., 1 map.

Onchocerca flexuosa which causes lesions in the feet of white-tailed and mule deers (rarely elk) was found in 79 out 424 (18.63 percent) animals; the highest rate of occurrence was in male adults (43 out of 62). The parasite is most abundant where the deer are most crowded.

Diseases and Parasites: Pseudotuberculosis

Beaudette, F. R. A case of pseudotuberculosis in a blackbird, Journ. Amer. Vet. Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 97(761), Aug. 1940, pp. 151-157.

Review of literature (28 titles cited) on occurrence of this disease in birds of other countries and report of what is thought to be the first definite record for the United States. Brunswick, N. J. Symptoms, lesions, results of laboratory cultures.

Ecology: Beaver-trout relationship

Rasmussen, D. I. Beaver-trout relationship in the Rocky Mountain region, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 256-263, 2 figs., 3 tables.

Eastern studies are reviewed and the probability suggested that their findings are not applicable to the very different environment of Utah. A large-scale investigation was made in the Wasatch National Forest, covering nearly 600 miles of streams occupied by beavers. The area contained 380 active colonies, 1,505 dams, 1,143 ponds, and an estimated population of 1,976 of the animals. Comprehensive studies made of practically all conditions affecting trouts are reported in some detail. They revealed very few factors that might be adverse; the most harmful one was obstruction of movements of the fishes by the beaver dams.

Ecology: Biologic balance

McAtee, W. L. Biologic balance on the farm, Smithsonian Report 1939 (1941) (Supt. of Documents, Washington, D. C. $1.50 a copy), pp. 319-325, 2 pls.

An essay on the interdependences of organisms based on everyday happenings on farms. The opposed tendencies of expanding ranges but maintaining territories are discussed as factors in bringing biologic balance. Man often ruthlessly disturbs the balance but will find it to his advantage to work, so far as circumstances permit, with, rather than in opposition to, nature.

This is a revision of an article of the same title in Soil Conservation, 5(4), October 1939, pp. 97-99, that was not called to attention at the time because of unapproved editorial changes.

Ecology: Bird distribution

Pitelka, Frank A. Distribution of birds in relation to major biotic communities, Amer. Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 25(1), Jan. 1941, pp. 113-137, 11 figs. (maps).

Discussion of the life-zone concept and of criticisms of it. Biomes, or floral-faunal communities, are defined and mapped, and the correlation with them of the ranges of 27 species of birds reported. The distribution of birds is affected by life forms of plants and is modified by successional phenomena. Bibliography of 46 titles.

Ecology: Drainage operations

Bourn, Warren S. Wildlife management on land ditched for agriculture, Trans. Fifth N. A. Wildlife Conference, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 296-300.

This article gives statistics indicating the extent of drainage and notes that about a twelfth of the land under organized drainage is in districts that have become inactive or that have been abandoned for agricultural purposes. Unorganized drainage doubtless has been no more successful and the whole movement has resulted in much unnecessary destruction of wildlife habitat. Various types of damage are specified. The Biological Survey by obtaining the right to review proposals for drainage involving expenditure of Federal funds was enabled to check unwise drainage. Some projects have been disapproved and others approved with provisos safeguarding the interests of wildlife.

Ecology: Fire

Maissurow, D. K. The role of fire in the perpetuation of virgin forests of northern Wisconsin, Journ. Forestry (Mills Bldg., 17th St. & Pennsylvania Ave., N. W., Washington, D. C. 50 cents a copy), 39(2), Feb. 1941, pp. 201-207, 2 tables.

Methods of the study, and the findings for mixed hardwoods and the hemlock-hardwood type, are described. Within the past 5 centuries fires have burned through 95 percent of the virgin forest of Wisconsin. Such fires are to be regarded as "periodic and ecologically normal events in the life of the forest." "Fires have been necessary factors or agents in the perpetuation of a number of species x x x thus determining the form and composition of the forest." "Practically all 'virgin' stands are really successfully rehabilitated areas [that have been] burned over." "Although fire may be looked upon, from the silvicultural point of view, as a factor inimical to the normal development of the forest, it has been and is, from a broad ecological viewpoint, a normal, beneficial and necessary factor in the perpetuation of virgin forests."

Ecology: Of groups of birds and mammals

Taylor, Walter P. Ecological classification of the mammals and birds of Walker County, Texas, and some adjoining areas, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 170-176.

Author's summary: "An ecological classification was attempted of the 49 mammals and the 171 birds of Walker County, in eastern Texas. Each species is listed but once, so the classification is somewhat arbitrary because of overlapping functions. Allowances being made for this method of classification, there are among the mammals one seed eater, two house followers, three soil workers, four flesh-eaters or regulators, six insect-eaters, seven buffer species (serving as food for fur animals, game, and regulators), seven domestic animals, nine fur animals, and ten game species. The birds include one species sometimes injurious to trees, three omnivores of variable ecologic reference, fourteen water birds, seventeen flesh-eaters, eighteen song birds (mostly fruit, seed, grain, and insect eaters), twenty conspicuously insectivorous forms, twenty-five seed- and insect-consuming species, twenty-five game birds, and forty-eight tree protectors. Most of the non-game species are

ecologically interrelated with the game animals, either as predators, prey, food, competitors, or otherwise; indeed, there is probably not a single species of bird or mammal that possesses no ecological connection with some of the game species. In a majority of cases the relation is probably insignificant, but in a substantial proportion it is important. In order to provide for effective game management we must know as much as possible about the non-game species as well as about the game forms. Then, also, many of the non-game birds and mammals are of substantial interest and value in their own right."

Ecology: Land-use in relation to wildlife

Dambach, Charles A. The effect of land-use adjustments on wildlife populations in the Ohio Valley region, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 331-337, 1 fig., 2 tables.

Wildlife populations are largely controlled by land-use. Effects produced by the adoption of certain soil-conservation practices in the region specified are reported. Shift in acreage from corn and small grains to meadow may result in material increase in the population of farm breeding small birds. (See abstract of his paper with E. E. Good in WILDLIFE REVIEW, No. 26, Feb. 1940, pp. 30-31.) On the other hand the pheasant is adversely affected by such a change. The number of small birds is practically in direct proportion to the amount of field border cover, hence farm practices that reduce this type of shelter depress the bird population. Allowing fields to return to brush, at first greatly encourages rabbits and small birds. Breeding bird populations are notably greater in ungrazed, than in grazed, woodland. In the latter, ground- and shrub-nesting species are almost wholly excluded. Adoption of soil conservation practices in some cases has increased farm bird populations up to 58 percent. Bibliography of 9 titles.

Ecology: Pheasant

Bennitt, Rudolf, and Harold V. Merrill. Possible temperature factors in north central pheasant distribution, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 433-452.

Circumstantial evidence supporting a working hypothesis: That one reason for the failure of pheasants to establish themselves naturally in large numbers south of a line, which very closely follows the boundary between Thornthwaite's micro- and meso-thermal provinces, is high egg temperatures resulting in the death of embryos. Available evidence is presented and the suggestion made that related ecological factors be made the subject of research. Bibliography of 7 titles.

Ecology: Population, fluctuations

Lindeborg, Robert G. Fluctuations in the abundance of small mammals in east-central Illinois, 1933-1939, Ecology (Prince & Lemon Sts., Lancaster, Pa. $1.50 a copy), 22(1), Jan. 1941, pp. 96-99, 1 fig. 1 table.

Description of the area and of the methods of the study and of variations in the numbers of small mammals that are further depicted in both table and graph. Author's summary: "The wood-mouse and shrew populations were high in the Trelease Woods near Urbana, Illinois, in the fall of 1934, low in 1935 and 1936; showed partial recovery in 1937; and reached 'peak' abundance in 1938. The relative abundance of food furnished by seed-bearing trees may be a factor in these fluctuations in the numbers of small mammals, but other unknown factors also must be involved."

Ecology: Range surveys

Hasel, A. A. Estimation of vegetation-type areas by linear measurement, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 39(1), Jan. 1941, pp. 34-40, 1 fig., 4 tables.

"Maps are very useful in providing a picture of the location of vegetation types, but mapping as a method for determining type areas may be inadequate." "When ground surveys are used, a promising alternative to mapping is to estimate vegetation-type areas by application of the linear-measurement method, by which distances through each type are measured along parallel survey lines. These linear measurements are converted to an area basis by using a factor which depends upon the spacing of lines, and the result is taken as an estimate of area in the type." The method is discussed and illustrated by graphs and tabulations and its mathematics demonstrated.

Ecology: Range surveys

Pechanec, Joseph F. Sampling error in range surveys of sagebrush-grass vegetation, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 39(1), Jan. 1941, pp. 52-54, 1 table.

"One major objective of a range survey is to determine the forage cover, as a basis on which to estimate grazing capacity. However, it is extremely unlikely that the estimated forage yield of an area will coincide with the actual yield, even if methods of measuring vegetation are without error, and if individual members of survey crews are mechanical in their precision. If sampling units are drawn correctly, however, an estimate of the magnitude of the difference between the estimated and actual yield and the likelihood of the occurrence of such difference is provided by the unbiased estimate of sampling error. An unbiased or representative estimate of sampling error also provides appropriate information for estimating the number of sampling units (plots) needed to attain arbitrary limits of accuracy in future surveys on similar range areas." The author recommends strictly random sampling and greater rather than lesser intensity of sampling.

Education

Anon. Suggested unit material prepared to show how pupil experiences in conservation of renewable natural resources may be provided in the second year of the core curriculum of secondary schools, Virginia Commission of Game and Inland Fisheries [et al] (Blacksburg, Va.), 21 pp. (mimeographed), Sept. 1940.

Directions for organizing a pupil experience unit are given in detail in chart form. The treatment as to conserving wildlife begins on page 10 and includes: Exploration, orientation, planning, development, and summarizing, and a bibliography of 15 titles.

Education: Conservation

Bathurst, Effie G. Conservation excursions, U. S. Office of Education Bul. 1939, No. 13 (Supt. of Documents, Washington, D. C. 15 cents a copy), v+106 pp., illus., 1940.

The purposes and uses of excursions are outlined, preparations for them both by teacher and class suggested, and sampling journeys and follow-up activities discussed. Wildlife is given due prominence in the text, in a tabulation of instructional methods, and in a 5-1/2 page bibliography.

Education: Conservation

Bathurst, Effie G. Teaching conservation in elementary schools, U. S. Office of Education, Bul. 1938, No. 14 (Supt. of Documents, Washington, D. C. 20 cents a copy), v+125 pp., illus., 1940.

"The purpose of this bulletin is to aid teachers in the selection, adaptation, and organization of materials for the teaching of conservation in grades 1 to 7 or 8." It is especially devoted to teaching methods, seems largely concerned with soil conservation, and treats wildlife rather incidentally.

Education: Conservation

Bathurst, Effie G. Curriculum content in conservation for elementary schools, U. S. Office of Education, Bul. 1939, No. 14 (Supt. of Documents, Washington, D. C. 15 cents a copy), v+79 pp., illus., 1940.

"The purpose of this bulletin is to suggest educative values of conservation in their relation to curriculum content in such a way that the teacher can quickly consider them in her plans for teaching and better help her pupils to participate in conservation enterprises of worth to the community." Wildlife teaching (pp. 25-34) is typified by a section on birds under the following headings: Understandings to be developed, participation in conservation activities, and attitudes and continuing interests. Animals are briefly mentioned elsewhere and the terminal bibliography includes 20 entries relating to birds.

Education: Conservation

Cook, Katherine M., and Florence E. Reynolds. Opportunities for the preparation of teachers in conservation education, U. S. Office of Education, Pamphlet No. 90 (Supt. of Documents, Washington, D. C. 5 cents a copy), 13 pp., 1940.

"Courses concerned with the conservation of our natural resources and designed for teachers in elementary and secondary schools are available in at least 138 institutions of higher learning located in 35 different States." In 5 States--Arkansas, Florida, Oklahoma, Tennessee, and Wisconsin--the teaching of conservation in the public schools is required by law. Data regarding courses in conservation education are summarized, and also tabulated in detail by States and institutions. Descriptions of representative courses are given, as well as a supplementary list of institutions offering specialized education in this field.

Education: Conservation

Gabrielson, Ira N. Wildlife conservation (The Macmillan Co., New York, N. Y. $3.50 a copy), xv+250 pp., 32 pls., 23 figs., 1941.

Biological interchange and the interdependence of conservation programs are discussed in the first seven chapters of this book; the others are entitled: Some basic facts in wildlife conservation, resident game, migratory birds, fur animals, nongame birds and mammals, rare and vanishing species, predator relationships, wildlife refuges and their place in conservation, and surmounting the obstacles to conservation. "Three concepts are considered to form the basis of the conservation movement: (1) That soil, water, forest, and wildlife conservation are only parts of one inseparable program; (2) that wildlife must have an environment suited to its needs if it is to survive; and (3) that any use that is made of any living resource must be limited to not more than the annual increase." Without some of the appurtenances of a text-book, this work was prepared for use in the secondary schools, for which purpose as well as for adult reading it should be valuable.

Education: Conservation

Palmer, E. Laurence. Waterways in spring, Cornell Rural School Leaflet (Cornell University, Ithaca, N. Y.), 33(4), March 1940, 32 pp., 2 figs., 13 cartoons, 6 tables.

General information on ponds, lakes, streams, marshes, and bogs; and discussion of their vertebrate life. The mammals treated are the muskrat, mink, otter, and raccoon. The value of their furs in New York is tabulated for the years 1927 and 1936. The muskrat crops in Maryland and Louisiana are cited for comparison. The take of the fur species mentioned is summarized by States for 1937 and the production per square mile of the three more common kinds, calculated. Returns from furs are widely distributed and this asset should be carefully preserved.

The birds treated are waterfowl, the take of which in New York is tabulated for 7 years in the period, 1921-1936. There are chapters also on salamanders and frogs, and snakes and turtles. Conservation for economic values is the keynote of the publication.

Education: Conservation

Renner, George T., and M. H. Hartley. Conservation and citizenship (D. C. Heath & Co., Boston, Mass. $1.52 a copy), x+367 pp., 118 illus., 1940.

A text-book, by two professors and prefaced by a third, in which the aims are stated: "(1) To learn how our country's resources have been used and how they have been misused; (2) to examine the steps which have been taken toward a better use of our resources; (3) to find out what meanings and ideas are involved in the present use of the term conservation." Conservation is planned use; all types are considered. Chapter 6 (pp. 185-215) is entitled "Our vanishing wildlife." Its aims are: "(1) To consider general changes in animal and plant life brought about by man; (2) to note examples of wildlife destruction in order to understand the seriousness of the problem as a whole; (3) to determine the steps which can be taken toward restoring wildlife and preventing further depletion."

Section headings indicating the nature of the treatment are: Disappearing wildlife, wildlife in early America, the American bison, the American parakeet, market hunting, fur trapping, industrial development and wildlife, economic value of wildlife, conservation and restoration. Practical exercises and activities are suggested in connection with each chapter and there is a sectionalized bibliography. The part on wildlife includes 16 titles. Another appendix lists sources of motion pictures pertaining to all departments of the book.

Education: Conservation in geography teaching

Bennitt, Rudolf. Wildlife conservation and geography, Journ. Geogr. (A. J. Nystrom & Co., 3333 Elston Ave., Chicago, Ill. 35 cents a copy), 39(6), Sept. 1940, pp. 217-225.

Comment on treatment of wildlife in geographic texts; it is chiefly economic and deals little with management and harvesting. Man's activities have decreased some species and increased others so that wildlife as a whole is different from what it was. Management may be guided so as to favor the more desirable animals, and teaching should stress the status of wildlife as a renewable natural resource. Harvesting is justifiable so far as management replaces the quota taken. The customary approaches to wildlife maintenance are discussed under the headings of: Restrictive laws, artificial restocking, and refuges. Suggestions are given as to the handling of conservation teaching in the schools.

Education: Ornithology notebook

Allen, Arthur A. Ornithology laboratory notebook (Comstock Publishing Co., Ithaca, N. Y. $3.00 a copy), 4 Ed. 1941, 204 pp., 1 col. map (life zones), many figs.

This edition has been modified so as to apply less exclusively to northeastern birds and has the subtitle: "For recording observations made in the field and studies made in the laboratory on the birds of North America." It contains directions for study of skins and skeletons, an illustrated key to the orders of N. A. birds, and another to the nests of the commoner northeastern species, condensed statements of the summer and winter ranges of N. A. birds with migration data for central New York, and 188 outline drawings for filling in with colors. There are in addition many schedules for recording information about birds studied and making lists of those seen.

Food Habits: Bird enemies of grasshoppers

Neff, Johnson A., and C. C. Wilson. The influence of birds on local grasshopper outbreaks in California, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 189-195, 2 tables.

Notes on previous studies of the bird enemies of grasshoppers, and on outbreaks of these insects in California, dating back to 1722. Recent infestations have done a million dollars damage annually. During one of these outbreaks, stomachs of 121 birds of 16 species were collected and examined; grasshopper remains were found in 80 of them, representing 11 species. Crows, yellow-billed magpies, Brewer's blackbirds, tricolored redwings, and meadowlarks made the best records as enemies of the insects. The results of the stomach analyses are given in two tables. These specially collected data are too few to warrant close estimates of the grasshopper destroying capacity of birds, but general field observations strongly indicate value in that respect. Bibliography of 5 titles.

Food Habits: Mouse damage

Isaac, Robert. Mice and conifers, American Forests (919 Seventeenth St., Washington, D. C. 35 cents a copy), 47(1), Jan. 1941, pp. 32-33, 5 photos.

Work of meadow and pine mice in plantations; all trees in some Connecticut nurseries were destroyed. Preferences of the mice are discussed and the damage described and illustrated. Reference is made to a means of control developed by the Fish and Wildlife Service to which organization inquirers are referred.

Food Habits: Nutrition; vitamins

Holmes, Arthur D., Francis Tripp, Frank C. Ashbrook, and Charles E. Kellogg. A study of Vitamin A in the nutrition of foxes, U. S. Dept. of the Interior, Wildlife Research Bul. 3 (Supt. of Documents, Washington, D. C. 5 cents a copy), 15 pp., 3 tables.

Noted here for the reference to wild foxes; analyses of 22 livers (from Conn., Mass., Md., N. Y.) revealed fat and vitamin A contents averaging materially higher than those for pen-raised animals.

Food Habits: Seed destruction

Anon. The animal factor in natural reproduction of jack pine, Lake States Forest Expt. Station (St. Paul, Minn.), Technical Notes 172, 1 p. (mimeographed), Jan. 1941.

Stomachs of 4 species of small rodents and 2 of sparrows were examined; jack pine seeds were found in 10 of 22 white-footed mice and in 3 of 8 chipping sparrows. Middens made by red squirrels feeding on the cones also were observed. Four-fifths of seeds exposed in low-sided screen baskets were consumed in 10 days. Planted seeds protected only by soil suffered 39 percent loss while those given special protection from birds and rodents lost 18 percent (germination failures plus insect damage).

Food Habits: Utilization of Mormon cricket

LaRivers, Ira. The Mormon cricket as food for birds, Condor (J. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 43(1), Jan.-Feb. 1941, pp. 65-69.

Notes on 36 species of birds observed to feed on Anabrus simplex in Nevada in 1939.

Food Habits: Utilization of Osage orange

Wade, Douglas E. Osage orange and wildlife, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(11), Feb. 1941, pp. 10, 32, 5 photos.

Review of literature (6 titles cited) and report on personal observations on use of the hedgeapples by rabbits, squirrels, pheasants, crows, and small birds. The apples averaged 14.5 ounces in weight. Suggestions are given as to seed treatment and as to the use of osage orange in wildlife management.

Food Habits: Of antelope

Rouse, Charles H. Notes on winter foraging habits of antelopes in Oklahoma, Journ. Mammalogy (Am. B. Davis, College Station, Texas. $1.00 a copy), 22(1), Feb. 1941, pp. 57-60, 1 map.

Field observations on antelopes introduced to the Wichita Mountains Wildlife Refuge. Notes on 15 groups of plants eaten and the extent of their utilization. Shrublike perennials made up the greatest part of the forage. Brief notes on habits.

Food Habits: Of bob-white

Johnson, J. A. A study of bobwhite foods in relation to farm problems in northern Mississippi, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 337-343, 1 fig., 2 tables.

Author's summary: "(1) A total of 1,835 quail crops was saved by hunters from eleven contiguous counties in northern Mississippi during the hunting seasons of 1937-38, 1938-39, and 1939-40; (2) contents of the crops were analyzed and the data combined into county summaries by years; (3) the county summaries were combined each year because all had similar agricultural conditions; (4) a total of twenty-two items was found to constitute the bulk of foods during the three years; sixty-seven additional foods, exclusive of insects, were found in small quantities only; (5) the twenty-two species are given special consideration in connection with their adaptability to practices of crop production, pasture improvement, field border and gully control, wildlife areas, and woodland management which are needed for soil conservation on individual farms."

Four foods that constituted from 62 to 72 percent of the food in the 3 years were annual lespedezas, acorns, soybeans, and cowpeas.

Food Habits: Of chipmunk

Aldous, Shaler E. Food habits of chipmunks, Journ. Mammalogy (Wm. D. Davis, College Station, Texas. $1.00 a copy), 22(1), Feb. 1941, pp. 18-24, 1 table.

Report on food from 71 stomachs and 50 cheek pouches collected in Minnesota; the items are tabulated according to frequency of occurrence and are discussed in some detail. Orthoptera led among animal, and blueberries among vegetable, foods. The economic bearing of the chipmunk's feeding habits is considered. Bibliography of 3 titles.

Food Habits: Of goshawk

McDowell, Robert D. The eastern goshawk in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(11), Feb. 1941, pp. 5, 31, 1 map, 2 photos, 3 tables.

Report upon 270 birds presented for bounty payment in 3 years during which there was no unusual influx. Sex and age classes and weights are summarized. Nearly three-fourths of the food consisted of game species (squirrels, rabbits, ruffed grouse) and poultry. The effectiveness of the bounty as a control measure is discussed.

Food Habits: Of hawks and owls

Bennitt, Rudolf. The Macon County hawk and owl investigation, Bluebird (Audubon Society of Missouri, Sullivan, Mo.), 8(2), Feb. 1941, pp. 9-10 (mimeographed).

Report on analysis of the stomach contents of birds killed in a county campaign against hawks and owls. The data are summarized by species and for the entire collection. Five species of hawks and four of owls were represented. The birds had not killed any appreciable number of game, poultry, or other birds. They had eaten mice chiefly and made an occasional meal on rab-

bits. The author believes that locally gathered evidence is necessary to convince people of the economic value of birds of prey.

Food Habits: Of owl, burrowing

Hamilton, W. J., Jr. A note on the food of the western burrowing owl, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 43(1), Jan-Feb. 1941, p. 74.

Report on food remains collected at a prairie-dog colony in Denver, Colo.; crayfishes the most prominent food item.

Food Habits: Of wild turkey

Bennett, Logan J., and P. F. English. November foods of the wild turkey, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(10), Jan. 1941, p. 8, 1 photo, 2 tables.

Report on the contents of 15 crops; vegetable matter 97.7 percent, the leading items being wheat, corn, and acorns; all food groups identified are listed.

Introductions: In Alaska

Murie, Olaus J. Wildlife introductions in Alaska, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 432-436.

Ordinarily introductions are attempted where wildlife has been depleted, and although Alaska hardly answers to that description, a good many introductions have been made. The author discusses those of the musk-ox, buffalo, black-tailed deer, Roosevelt elk, reindeer, blue fox, and ground squirrel. Probable success is indicated for some of these ventures and unfortunate results from others. "Such projects should rest not on mere wishful thinking or a desire merely to 'do something,' but on a real need, after careful study of requirements of the introduced species and of the resident species with which they will come into competition."

Introductions: Birds

Cooke, May T., and Phoebe Knappen. Some birds naturalized in North America, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 176-183.

List of 9 species, the importation of which is forbidden. Two of them, however, are widely established in the United States and two others near the border in British Columbia. Despite large annual importations, few species have been accidentally naturalized. The history and present status of 12 introduced species are recounted. They include the: mute swan, rock dove, Chinese spotted dove, ringed turtle dove, Australian crested dove, Mexican

conure, European skylark, European starling, crested myna, English sparrow, European tree sparrow, and European goldfinch.

Introductions: Game

Bump, Gardiner. The introduction and transplantation of game birds and mammals into the State of New York, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 409-420, 2 tables.

Since 1880, eighteen species of game mammals and twenty-one of birds have been imported, some of them in considerable numbers. Available information about these introductions is recorded in the tables. The proportion of success to failures is rather higher than is the average for such experiments. The author cites 9 points that should be taken into consideration when planning introductions in order still further to reduce the percentage of failures.

Introductions: Game

Ruhl, H. D. Game introductions in Michigan, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp.424-427.

The author recounts Michigan experience with the reindeer, moose, elk, pheasant, sharp-tailed grouse, Hungarian partridge, and capercaillie. The author's conclusions are: "(1) Where a choice exists, it usually is better to work with native rather than exotic species; (2) introductions should be made only after inventory of existing species and unoccupied range rather than on basis of successes elsewhere of exotics or the advice of pressure groups; (3) the value of introduction is far over-estimated by the public and by too many game administrators; (4) introductions usually have failed except (a) where changes in environment have depleted native stock so as to leave an unfilled ecological niche; (b) where introduced species perhaps of better sporting qualities or better adaptability to heavy gunning, displace native species and (c) re-introduction of indigenous species; (5) the continued introduction and release of native species already established appears to be economically impracticable as far as proven biological results are concerned; (6) additional introduction of exotics after such species have established themselves usually is impracticable at any cost consistent with the charges for public hunting licenses."

Introductions: General

Hicks, Lawrence E. The role of exotics in the Ohio Valley, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 420-424.

Abstracted from Release 133, Ohio Wildlife Research Station, in WILDLIFE REVIEW, No. 27, May 1940, p. 27.

Introductions: Goat, Rocky Mountain

Swift, Lloyd W. Rocky Mountain goats in the Black Hills of South Dakota, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 441-443.

Abstracted from South Dakota Conservation Digest in WILDLIFE REVIEW, No. 28, August 1940, p. 25.

Introductions: Hog, Wild

Shaw, A. C. The European wild hog in America, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 436-441.

Introduced into western North Carolina in 1910, the animals now interbred with domestic swine, exist in limited numbers that are kept in check by hunting. A sub-planting to California has been moderately successful. "Damage to national forest resources has not occurred to such a degree that rigid control or extinction is desirable. The situation is being further observed by administrative officers of both the Forest Service and the cooperating agency." The bulk of this paper is a condensation of LeRoy C. Stegeman's account that was abstracted in WILDLIFE REVIEW, No. 16, Nov. 1938, p. 23.

Introductions: Partridges

Gerstell, Richard. The Hungarian and chukar partridges in Pennsylvania, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 405-409.

Abstracted from Pennsylvania Game News in WILDLIFE REVIEW, No. 28, Aug. 1940, p. 25.

Life Histories: Beaver

Cox, W. T. The beaver-friend of the forest, American Forests (919 Seventeenth St., Washington, D. C. 35 cents a copy), 46(10), pp. 448-450, 476-477, 8 photos.

In checking erosion, holding back flood waters, building meadows, and checking forest fires, the beaver is a friend of the forest. General description (including original contributions) of the habits, life history, and economic value of the beaver. Most claims of damage are inspired by a desire to trap the animals for gain. Flooding can be prevented by putting through the dams at the desired level pipes that protrude several feet both above and below the structure; apparently the problem of closing these is beyond the beaver's powers.

Life Histories: Blackbird, Red-winged, sex ratio

Williams, J. Fred. The sex ratio in nestling red-wings, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 52(4), Dec. 1940, pp. 267-277, 3 figs., 2 tables.

From author's summary: "In a study of nestling Eastern Red-wings made at Indian Lake, Ohio from June 18 to July 22 it was found that the young could be sexed by dissection at any time after hatching. With the age of nestlings known to the nearest day it proved possible to distinguish between the sexes by means of weights after the fifth day, and by means of tarsal lengths after the eighth day." The sex ratio was even.

Life Histories: Buffalo

Haines, Francis D. The western limits of the buffalo range, Pacific Northwest Quarterly (University of Washington, Seattle, Wash. 50 cents a copy), 31(4), Oct. 1940, pp. 389-398.

Compilation of the records from 33 cited publications. No dependable records of buffaloes in southern Oregon, northern Nevada, and northeastern California within historic times.

Life Histories: Condor, California

Harris, Harry. The annals of Gymnogyps to 1900, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 43(1), Jan.-Feb. 1941, pp. 3-55, Figs. 1-22 (one, a col. pl.)

Abstract of the literature 1602-1900 by an accomplished bibliographer; a necessary source paper for anyone who wishes to write exhaustively of this bird.

Life Histories: Cottontail, Iowa

Hendrickson, George O. Nesting cover used by Mearns cottontail, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 328-331.

Author's summary: "From April-September, 1939, fifty-one cottontail nests were found on 118 acres of three Iowa agricultural tracts in attempts to discover all nests. The soil varied from clay to sandy loam and loess. Spring populations were estimated at 0.3-2 cottontails an acre and fall populations at 0.6-4 cottontails an acre. The ground cover was chiefly bluegrass, timothy oats, and alfalfa, partly in open fields and partly in orchard and arboretum. One nest was under a vacant beehive. In herbaceous cover, 8 inches or taller and dense enough to conceal an adult cottontail at the time a nest was used, twenty-two nests were 0-210 feet (average 65 feet) from the nearest woody or other cover of protective value. In short herbaceous cover and strawpile, twenty-eight nests were 0-205 feet (average 24 feet) from the nearest woody or protective cover. Of the nesting materials 32 per cent was hair and 68

per cent plant debris such as was readily available. In the search for nests the elliptical bare spot of earth about 0.5 foot in area usually found in front of a nest was the most helpful sign. The average dimensions of the burrows containing nests were 3.9 inches deep, 5.1 inches wide, and 6.3 inches long. Seven nests contained an average of 3.4 living young and four nests averaged 2.5 dead young. Over a 4-year period reports of other observers of seventeen nests found at random showed an average of 6.4 young, including a maximum of 12 young of two sizes or age classes.

Life Histories: Cottontail, Pennsylvania

Boule, John D. Cottontail nesting-study in Pennsylvania, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 320-328, 2 figs., 3 tables.

Investigation made in Centre and Lehigh counties. Author's summary: "(1) Twenty-five active nests and sixty-six old nests were found by systematic search from April 1, 1939, to September 15, 1939. Eighty-six nesting cavities that were never completed as nests were also found by this method; (2) nests were located in a variety of habitats, but the majority were found in wastelands, alfalfa, orchards, and hayfields; (3) the peak of nesting activities was recorded late in May and early in June, and progressively fewer nests were found throughout the remainder of the nesting season; (4) twenty-six litter counts ranged from three to eight young and averaged 5.42 in a litter. Larger litters were found early in the season; (5) one female, known to be in her first breeding season, had only one litter for the year; (6) ordinarily the female rabbit returned to the nest only to feed the nestlings. A timing apparatus recorded one feeding period about dusk and indicated a second feeding period about dawn. Young rabbits could call the female in time of danger by squealing; (7) skunks, the larvae of the flesh-fly (Wohlfahrtia vigil), and man destroyed nine of the twenty-five active nests under observation. Reliable cooperators noted the destruction of one nest by a weasel and of another by shrews or mice; (8) the presence of the pellets of the young in or about the peripheries of a nest seemed to indicate success for that nest. Twenty-two of the thirty-four old nests examined contained pellets and indicated the success of 64.7 per cent, as compared with the known success of 64 per cent of twenty-five active nests." Bibliography of 9 titles.

Life Histories: Duck, Ruddy

Zimmerman, F. R. The ruddy duck in Wisconsin, The Passenger Pigeon (W. E. Scott, Wisconsin Dept. of Conservation, Madison), 2(10), Oct. 1940, pp. 111-116, 2 figs.

Largely compiled account, treating local names, and nesting in Wisconsin and in other regions. Bibliography of 21 titles.

Life Histories: Gull, Franklin's

DuMont, Philip A. Relation of Franklin's gull colonies to agriculture on the Great Plains, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 183-189, 3 tables.

Franklin's gulls, originally of rather restricted breeding distribution and migration route, and further cramped by desiccation of their plains environment, have responded notably to the new facilities for nesting offered them by the migratory bird refuges. Resort to 8 of the refuges is described; colonies have included up to 20,000 nests. The birds feed largely over nearby agricultural land and must be a great factor in insect destruction. Bibliography of 6 titles.

Life Histories: Hawk, Pigeon

Craighead, John and Frank. Nesting pigeon hawks, Wilson Bul. (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 52(4), Dec. 1940, pp. 241-248, 4 photos, 1 table.

Report on observations of the nesting and feeding habits and of the occupants of 3 nests in Minnesota and 4 in Ontario. Food chiefly dragonflies, in part swallows.

Life Histories: Lapwing

Rinkel, G. L. Waarnemingen over het gedrag van de kievit (Vanellus vanellus (L.)) gedurende de broedtijd [Observations on the behavior of the lapwing during the breeding season], Ardea (Dr. C. C. A. Junge, Rijksmuseum van Natuurlijke Historie, Leiden, Holland), 29(2-3), July 1940, pp. 108-147, pls. 6-7, 9 figs. Summary in English.

While the lapwing is an A. O. U. Check-List bird, it is only a straggler to our continent. This paper is called to attention mainly because it makes a few suggestions for management of a shore bird. The migrations and breeding habits of this distinctly "territorial" species are described. Eggs of the lapwing are harvested in Holland and the management suggestions relate to that use. Leaving in the nest any proportion of the clutch of four down to a single egg does not activate further egg-laying but the female will incubate the residue. When the entire clutch is removed, however, the female will lay the first egg of the new clutch seven or eight days later. Three clutches may be removed and a fourth will be laid and incubated. An increase in lapwing population might be promoted by enlarging suitable breeding grounds and by minimizing disturbances to the breeding birds and thus increasing bigamy. Bibliography of 23 titles.

Life Histories: Mouse, White-footed

Nicholson, Arnold J. The homes and social habits of the wood-mouse (Peromyscus leucopus noveboracensis) in southern Michigan, Amer. Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 25(1), pp. 196-223, 3 figs., 1 table.

A study made in Michigan by the use of nest boxes and by marking individuals. The box is illustrated and methods of the study are described. Two hundred and eighty-eight individuals were handled, of which 60 percent were taken more than once; some as many as 10 to 25 times. The results are discussed under the headings of: Nest sites, seasonal variation in use of nest boxes, construction of nests, sanitation, co-residents, food and food storage, periods of residence, local movements, dispersal, sex ratio, relationship between adults and young, association of males with females, and inbreeding. The findings are discussed and summarized. Bibliography of 11 titles.

Life Histories: Otter, Sea

Scheffer, Victor B. The sea otter on the Washington Coast, Pacific Northwest Quarterly (University of Washington, Seattle, Wash. 50 cents a copy), 31(4), Oct. 1940, pp. 370-388, 2 pls., 1 map.

The depletion of this race (Enhydra lutris nereis) by the fur trade, the use of the animal by the natives, and the finishing off of the otters by riflemen, are the subjects of this historical compilation. References to about 15 publications.

Life Histories: Pheasant

Randall, Pierce E. The life equation of the ringneck pheasant in Pennsylvania, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 300-320, 9 figs., 12 tables.

The study was made in Lehigh County on land typical of first-class pheasant range and in one of the most productive agricultural sections of the State. Author's summary: "The pheasant population of the 1,675-acre study tract in the fall of 1938 was 950 birds, or 1 bird to 1.8 acres. Hunting and associated losses reduced the population to 300 pheasants in early December. Although the approach of the breeding season in late March apparently increased the vulnerability of the pheasants to predation, winter mortality was low. The study-area population dropped to 204 birds before spring. Many pheasants left the area during the winter when hand-picked standing cornfields were destroyed. The availability of standing cornfields and winter carrying capacity of a Pennsylvania area for pheasants seemed to be closely correlated. A breeding population of about 1 bird to 8 acres and a sex ratio of 1 cock to 7 hens occurred on the study area. In spite of the unbalanced sex ratio, 94.1 per cent of the eggs were fertile.

During this study 310 nests were under observation. The nesting season extended from April through August, reaching its peak in May and June. About half of the nests on the study area were in hayfields. Other important nesting cover included wheat, roadsides, and wasteland. In many hayfields a density of 1 nest to an acre was observed. The maximum density recorded was on a measured acre where ten nests were simultaneously occupied. When the density of nests approached or exceeded 1 to an acre, there seemed to be no tendency to seek a peripheral zone. The grouping of nests in certain parts of a field was often dependent upon the location of crowing areas. The number of eggs in a clutch decreased as the season advanced. This indicated that wildlife managers should encourage farming practices that would enable the first clutch to succeed. On the study area 25.4 per cent of the nests were successful. Nest mortality was large in all the important nesting covers, and no 'best' type for nesting was discovered. Mowing was the most serious cause of nest destruction, accounting for 49.8 per cent of the nesting losses. Predators were responsible for 30.7 per cent of the nest failures. Skunks and crows were the most serious nest-destroying species. Through renesting efforts, between 52 and 55 per cent of the hens on the study area raised broods. Juvenile mortality was comparatively low, as only 12.4 per cent of the hatch failed to reach maturity.

The population of the study area in the fall of 1939 was about 850 birds. This was an increase of 317 per cent from the breeding population, but it represented a reduction of 100 birds from the population in the fall of 1938. This decline in population was general throughout the pheasant range. The early summer drouth was believed responsible, as the mowing was done unusually early. The haying operations destroyed many nests that were within a few days of hatching. Delay of the mowing for one week on the entire study area would have increased the number of successful nests by 20 per cent."

Bibliography of 21 titles.

Life Histories: Rabbit, European

Southern, H.N. The ecology and population dynamics of the wild rabbit (Oryctolagus cuniculus), Annals of Applied Biol. (Cambridge University Press, 200 Euston Road, N.W. 1, London, England), 27(4), Nov. 1940, pp. 509-526, Pl. 22, 2 figs., 3 tables.

Techniques of live-trapping and ear-marking the rabbits are described as is also the habitat in Berkshire, England, where the work was done. Biology is treated under sections on: Feeding areas, food and feeding habits, excreta, feeding rhythms, sex differences, age determination, reproductive physiology, colonization, disease and parasites, aberrant types, and migration. Vital statistics discussed include: The survival rate, distribution of births and disappearances, turn-over in the population, and mortality. Bibliography of 19 titles.

Life Histories: Shrew, Smoky

Hamilton, W. J., Jr. The biology of the smoky shrew (Sorex fumeus fumeus Miller), Zoologica (New York Zoological Society, New York, N. Y.), 25(4), Dec. 1940, pp. 473-492, 4 pls., 1 fig., 1 table.

Report on intermittent, but in part intensive, studies begun in 1927. Description of the animal, including its measurements and weight, is full. The article contains sections also on habitat, activity, associates, burrows and nests, voice, senses, food, reproduction, dermal glands, life span, populations, and enemies. Age classes can be separated by weights; the food is 80 percent insect; litters average 5.5 in number; the life span is short--14-17 months; populations vary from 5 to 50 individuals per acre in late summer but only 20-25 percent of the whole number survives the winter. Bibliography of 21 titles.

Life Histories: Tortoise, Desert

Woodbury, A. M., and Ross Hardy. The dens and behavior of the desert tortoise, Science (Lancaster, Pa. 15 cents a copy), 92(2397), Dec. 6, 1940, p. 529.

Gopherus agassizii. Preliminary statement of the results from studies of 68 dens and the marking of about 500 animals. Notes on habits and characteristics of dens; territories vary from 10 to 40 acres.

Life Histories: Woodpecker, Ivory-billed

Tanner, James T. Three years with the ivory-billed woodpecker, America's rarest bird, Audubon Magazine (formerly Bird-Lore, 1006 Fifth Ave., New York, N. Y. 35 cents a copy), 43(1), Jan.-Feb. 1941, pp. 5-14, 4 pls.

The decline of the ivory-bill resulted chiefly from the destruction of essential habitat by logging operations with random shooting and collecting as accessory causes. The bird apparently persists in small numbers in five localities in Louisiana, Florida, and possibly South Carolina. Notes are given on character of habitat, and on feeding, courting, and nesting habits. Suggestions are made as to how the species may be preserved.

Management: Aquatic plants

Anderson, Harry G. Studies preliminary to a waterfowl habitat restoration program along the Illinois River, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 369-373.

The Illinois River valley attracts a large flight of waterfowl but profound changes in the environment, due to causes that are specified, have progressively decreased the utility of the area to the birds. To take care of the present and anticipated larger future concentrations, it is imperative

to improve conditions, especially with respect to fluctuations and turbidity. The relation of changing water level to the growth of 6 important aquatic plants is stated; all but one--the lotus--do better under stabilized conditions. The food supply for waterfowl is most abundant where water levels are constant; and scarcity due to inconstancy forces birds to cornfield feeding. Lotus and river bulrush dominate large areas but produce little food; practicable means of control are desirable. The 15 most desirable native duck foods are listed; they are generally dependent on stable water levels for satisfactory growth.

Management: Aquatic plants

Griffith, Richard E. Waterfowl management on Atlantic Coast refuges, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 373-377.

Types of environment are specified, the most desirable having a combination of fresh and brackish water. "The five principal management practices are: water manipulation, planting, vegetation control, controlled burning, and the production of supplementary food crops." Examples of the employment of each of these measures are described.

Management: Cottontail

Patton, C. P. Management of the cottontail rabbit in North Carolina, North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh), 5(1), Jan. 1941, pp. 3-4, 15-16.

Many who do not realize the value of rabbits for sport and food, consider them as pests and are anxious to extirpate them. Rabbits are often unjustly blamed for poor crop growths on field borders but that is usually due to the competition of tree roots. Damage is done, however, and methods of control are suggested, especially those which do not involve killing the animals. Natural enemies of rabbits are listed. Certain areas of the State are not fully stocked with cottontails but can be better populated through protection and management. Suggestions are made as to food and cover plants that may be favored, and also on construction of brush piles, and planting of soybeans and late corn to attract the animals to places where they can best be tolerated.

Management: Duck, Wood

Hawkins, Arthur S., and Frank C. Bellrose, Jr. Wood duck habitat management in Illinois, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 392-395.

About 15 percent of artificial nesting sites, provided in considerable numbers during 2 years, were occupied. They may vary considerably as to external appearance but should meet certain specifications as to size of

cavity and entrance, which are given. Other suggestions as to construction and placement are made. Cypress boxes were built at a cost of about a dollar each. Other occupants of the nest boxes, predators, and habitat requirements are discussed. Large numbers of the birds feed after harvest in corn and other grain fields; hence feed patches appear to be a desirable feature of management.

Management: Electric fence in

Burr, J. G. Electric fences that repel deer, Science (Lancaster, Pa. 15 cents a copy), 92(2397), Dec. 6, 1940, pp. 529-530.

A single electrified wire strung 5 feet outside the regular fence of the area to be protected was successful, apparently because the deer did not like to make the broader jump, paused to investigate the outer line, and received a repellent shock.

Management: Farmer-sportsman relationship

Chalk, John D., D. I. Rasmussen, Frank C. Edminster, Colin McF. Reed, Arnold Nicholson, and J. Paul Miller. Is the farmer-sportsman council the answer?, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Conference, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 54-73, with discussion pp. 73-82.

Chalk. Suggests appointment of a committee to make a thorough study of the subject.

Rasmussen. The State Game Refuge Committee and the Board of Big-game Control of Utah furnish an example of an organized body of representatives of various interests meeting together and arriving at a concerted program. The committee was first appointed to take action on problems resulting from re-introduction of the elk. That introduction and its effects are described, and the conflict between the interests of game and livestock in western States, and particularly in Utah, is reviewed. The committee performed its own field investigations, invoked cooperation, and held hearings; it had power to define boundaries of preserves and to regulate all activities upon them and to determine and regulate special big game hunting seasons. In illustration of its work, regulation of the original trouble-making Nebo elk herd is cited. From 1931 to date, it has been maintained at from 500 to 600 animals; in that period, 1,438 individuals were removed. Statistics are given as to transplantings, removals, and numbers of this and 7 other elk herds in the State. Deer problems have been alleviated by sale of special permits to kill antler-less animals. The committee has functioned harmoniously, efficiently, and fairly.

Edminster. Abstracted from a Soil Conservation Service leaflet in WILDLIFE REVIEW, No. 27, May 1940, p. 25.

Reed. Local rather than national handling of the farmer-sportsman problem seems the only possibility. Payment for hunting rights may be prac-

ticable on large areas under a single management but not on small farms. Pennsylvania experience with State hunting lands, and State-farmer, and sportsmen's club-farmer, cooperatives is outlined. To protect their hunting privileges, sportsmen must control vandalism.

Nicholson. Instruction of the youth, who in the next generation, will have the farm-hunting problem to handle, is the plea of this speaker. He agrees with Reed that local, not national, effort at improvement seems most feasible.

Miller. Refers to the American Game Policy as fundamentally sound and thinks a national council might be useful in making a similar contribution to the philosophy of the farm hunting problem.

Management: Farmer-sportsman relationship

Miller, J. Paul, and Burwell B. Powell. Why more wildlife is not produced on agricultural land, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 359-363.

Tentative conclusions drawn from a 2-year survey covering the entire United States. Nearly 90 percent of the potentially huntable land is devoted primarily to agricultural uses. Farm game constitutes 85 percent of the total national bag. The authors estimate that 82 percent of the available food and cover for wildlife (and 84 percent of that which it is feasible to manage) are on land devoted to agriculture. Game management methods often call for changes in farm practices but as such changes are adopted, as a rule, only upon proof of their utility to the farmer, wildlife managers must be prepared to demonstrate sufficiently attractive returns. For reasons that are cited, the authors doubt the practicability of farm game management for profit. Furthermore, on account of trespass difficulties, farmers are likely to consider game a liability rather than an asset. Cooperative programs usually have failed because promised protection from trespass (the chief tangible benefit to the farmer) has not materialized. It is the farmers who will ultimately determine the place of wildlife in our social structure and any schemes for management and utilization of farm wildlife must be such as they can approve, which means that they must fit into prevailing agricultural practices and land-use programs.

Management: Forest wildlife

Anon. Annual wildlife report 1940, Region One (U. S. Forest Service, Missoula, Mont.), 34 pp. (mimeographed), 1941.

The status of each big game animal is discussed, and wildlife activities, studies, and cooperation are described. The bulk of the leaflet is made up of tabulations of: Wildlife population estimates covering big game, predators, and fur animals; the estimated take of the same groups; reduction in numbers of big game by predators, starvation, disease, and other causes; days of use by hunters, trappers, and fishermen; acreage of State and Federal

game refuges on the forests and of other wildlife areas administratively designated; and results of law enforcement activities.

Management: Forest wildlife

Anon. Annual wildlife report 1940, Region Six (U. S. Forest Service, Portland, Oreg.), 20 pp. (15 of them tabulations) (mimeographed), 1941.

Points of interest connected with the management of wildlife on the national forests of this northwestern region, including: Elk herd regulation, browse studies, propagation of bitterbrush, planting of willows, and cooperation with State game departments. The statistical information embraces the customary estimated: wildlife censuses, hunter and trapper take, and drain from all other sources, the estimated kill by predatory animals being itemized. The number of days of hunter and fishermen use also is tabulated, and reports made on wildlife areas, livestock use, and law enforcement.

Management: Fur animals

Anon. Furbearers offer a profit to farmers, Missouri Conservationist (Missouri Conservation Commission, Jefferson City), 3(2), Dec. 1940, pp. 1, 7, 3 figs.

As late as 1929, Missouri trappers received a million dollars for their catch. Although returns have since declined to less than half that amount, fur animals are still an important source of income and some of them are of value on account of their food habits. Suggestions are given as to management to maintain this resource, especially measures that can be taken on individual farms.

Management: Fur animals

Olson, Herman. Fur bearers of the Superior, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 1(5), Feb. 1941, pp. 37-39.

Popular account of the species, their habits, and status. The principal factors in proper management are enforcement of protective laws that should be founded on determination of land-carrying capacity and of the abundance and allowable take for the different species. In a more advanced state of fur farming, restocking may be possible.

Management: Goose, Canada

Williams, C. S., and C. A. Sooter. Canada goose habitats in Utah and Oregon, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 383-387, 2 tables.

"The environment most important to geese is that required for breeding. It must not only meet the needs for nesting but must also contain within a comparatively limited area acceptable conditions for molting, brooding, resting, and feeding." A tabulation gives the number and percentage of nests in various types of cover in both States; they were most numerous in hardstem bulrush. Muskrat lodges were important as foundations for goose nests. Other preferences and habits of the birds, and how they may be catered to in management, are pointed out.

Management: Harvesting pheasants

Carlson, C. Edward. Minnesota's pheasant population, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 1(5), Feb. 1941, pp. 65-67.

Regulation of the kill is based on roadside counts; that for 1939 is described. The annual kill has averaged more than a million since 1932; figures are given also for Ohio, Oregon, Pennsylvania, Iowa, and Michigan, all smaller; and for South Dakota, larger. The Minnesota pheasant population is worth a million dollars annually and deserves careful management.

Management: Muskrat in relation to waterfowl

Krummes, William T. The muskrat: A factor in waterfowl habitat management, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 395-398.

In newly developed aquatic habitats, muskrats are destructive through burrowing into dikes, and in consuming waterfowl food and cover plants, especially those that have just been introduced; under these conditions the animals must be controlled. In established marshes, muskrats are useful in thinning the vegetation, especially in making trails and ponds; their lodges also provide foundations for many waterfowl nests.

Management: Planting willows

Seaman, Ellwood A. Plan to plant willows, Ohio Conservation Bulletin (Division of Conservation and Natural Resources, Columbus. 10 cents a copy), 5(3), March 1941, pp. 18-19, 5 photos, 1 drawing.

Although prepared with reference to fish management, this paper is of value in other fields for its directions for storing cuttings and for planting and other suggestions.

Management: Private shooting preserves

Williamson, Leslie A. Regulated private shooting preserves in Connecticut, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 354-359, 5 tables.

The regulations under which the preserves are established and conducted are explained. Of 20 areas put under this type of management since 1933, 7 have been operated by individuals, 9 by clubs, and 4 commercially; 1, 2, and 2 of these, respectively, were discontinued. The tables relate principally to the kill and the proportion it bore to the number of birds liberated (averages 30 to 46 percent).

Author's summary: "(1) Regulated private shooting perserves have been operating in Connecticut for the past six years; (2) private shooting preserves, operated under the regulations cited, do not seem to be harmful to the public interest; (3) at the present time hunting on private preserves does not appear to appreciably lessen the hunting pressure on public shooting areas; (4) the variation in percentage of kill on the different types of preserves is believed due to the hunting pressure; (5) over a 6-year period on the private shooting preserves, there was a difference between the number of birds liberated and the number killed of 21,252 birds. It is concluded that a considerable percentage of these birds drift off the preserves and are available to hunters on areas open to public shooting."

Management: Range appraisal

Swift, Lloyd W. Some criteria for determining proper forage utilization by big game on winter ranges, Journ. Mammalogy (M. B. Davis, College Station, Texas. $1.00 a copy), 22(1), Feb. 1941, pp. 47-53.

Comment on instances of overpopulation and depletion of environments. Winter range is usually the limiting factor. Methods of determining overuse are discussed and 4 criteria of overbrowsing are described and annotated. For determining initial stages of deterioration in big game winter range, the author's suggestions are: "(1) Locate the key areas, where game naturally concentrate or are concentrated during the severest part of the winter; (2) determine the key species [of plants], that is, the common and preferred species in the key area. Observe the degree of utilization, assuming that one-half use of annual growth in length on shrubs and one-half volume of perennial grasses is the most desirable; (3) observe the soil condition closely, to check on the first signs of advanced erosion as indicated by loss of surface soil through sheet erosion."

Management: Refuges, Federal

Anon. State has 17 national refuges, Florida Game and Fish (Commission of Game and Fresh Water Fish, Tallahassee, Fla.), 2(1), Jan. 1941, p. 8.

Name, date established, county in which located, and acreage; total 84,441 acres.

Management: Refuges, Waterfowl

Pirnie, Miles D. Small area management for waterfowl, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 387-391.

The objectives and techniques of management are listed and discussed. The author's summary and conclusions are: "(1) Areas of 1,000 to 5,000 acres may be successfully managed to provide protection and food for waterfowl and also to furnish outdoor recreation and nature education for people; (2) protection techniques include fencing, posting, and patrolling; (3) habitat modifications often can create new resting and feeding grounds at relatively low cost; (4) owing to their ability to forage for themselves, wild waterfowl concentrated at sanctuaries are by no means wholly dependent on artificial feeding; (5) protection and feeding do not pauperize wild waterfowl or destroy their migration instincts. Waterfowl do not always use the protection and feeds available to them; (6) small refuge areas may greatly increase the local kill of ducks and geese during the heavy flights. In average years they may cut down local kills and save many birds; (7) restocking with captive waterfowl is yet in the experimental stage, although success has attended a few efforts with the Canada goose;(8) caution must be exercised in drawing conclusions from brief tests or limited management experiments, because waterfowl behavior varies greatly from year to year. True causes are difficult to determine, and the results obtained one year cannot always be repeated even under apparently identical conditions."

Bibliography of 8 titles.

Management: Restoration

Day, Albert M. How goes the Pittman-Robertson Act?, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 36-40.

General account of this Federal legislation for wildlife restoration and of the program developed under it. Forty-three States have qualified for benefits and 180 of their projects have been approved. Illustrative examples are cited. The carrying out of the legislation has resulted in greatly increased employment by the States of men trained in wildlife management or the biological sciences. The act has also worked against the tendency to divert game-license funds to other than conservation purposes. The Biological Survey restricts its activities to approval of projects that are substantial in character and that are capable of restoring conditions suitable for wildlife.

Management: Salting

Anderson, I. V., and Raymond M. West. The distribution of salt for big game animals, Forest Service, Northern Rocky Mountain Region (Missoula, Mont.), Field Notes on Wildlife, 2(7), March 1941, 4 pp. (mimeographed.

Discussion of the objectives, technique, and expense of salt distribution. A manual of the subject for Forest Service employes. Authors' summary: "(1) Big game salting is practiced primarily for the purpose of properly distributing animals on the range to obtain more uniform use of forage, and thereby eliminate range damage by over-utilization, particularly on winter ranges; (2) the value of salting to supply a dietary deficiency is a secondary consideration at present; (3) salt grounds should never be located on critical winter range; (4) locate salt grounds between heads of minor drainages and on secondary ridges at lower limits of summer range and on summer range proper; (5) placing salt in natural licks is seldom, if ever, good practice; (6) use from 50 to 400 pounds per salt ground, with an average of 200 pounds; (7) place salt in field by June 15; (8) the cost of distributing salt on national forest ranges should be borne jointly by the State and Forest Service on a 50-50 basis."

Management: Seed harvesting and storage

Kubichek, W. F. Collecting and storing seeds of waterfowl food plants for propagation, Trans. Fifth N.A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 364-368, 1 fig.

Suggestions from experience of the Biological Survey as to gathering, curing, and storing seeds of several species of marsh and water plants. Seeds of species growing where grain-harvesting machinery can be used have been reaped, dried, and stored at costs of from 25 to 50 cents per bushel. Those of sago pondweed have been collected, cured, and cleaned on a large scale for 14 cents a pound. Methods for both dry and wet preservation are described, including use of a concrete storage cellar, description and plans for which are given.

Management: Seed treatment

Barton, Lela V. Germination of seeds, Scientific Monthly (Science Press, Lancaster, Pa. 50 cents a copy), 51(6), Dec. 1940, pp. 542-544.

Methods by which dormancy may be broken, including softening of hard seed coats, exposure to low or alternating temperatures, or to bacteria that break down the refractory shells, and removal of seed coverings. Various groups of plants utilized by wildlife managers are mentioned.

Management: On small farms

Gilfillan, Merrill C. Is wildlife management practical near population centers?, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 344-347, 1 table.

Study on a 1,576-acre tract of small farms in an industrial area in northeastern Ohio. Food patches were experimented with and restricted to

corn; safety zones were provided. The game and fur harvested are discussed and their value itemized. Author's summary: "(1) Wildlife management as practiced on this area is compatible with good farming and is acceptable to farmers; (2) the optimum of wildlife management was achieved on this area by managing swamps, planting food patches adjacent to swamps and saving game bird nests. A more intensive program might evoke the law of diminishing returns; (3) these practices produced a harvestable surplus of wildlife great enough to satisfy farmer and sportsman. The yield per square mile was 406 pieces of fur and game harvested in 1938 and 249 pieces in 1939; (4) the proximity of population centers created a demand for this surplus and provided a ready market which repaid farmers for their efforts; (5) the income from the fur crop represented profit to the farmers; (6) this income was great enough to justify the necessary changes in land-use; (7) the net income per acre from submarginal land compared favorably with that of farmed land."

Management: Soil conservation in relation to wildlife conservation

Parker, Lansing A. Soil conservation and wildlife, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 1(5), Feb. 1941, pp. 20-23.

The benefit of soil conservation practices to wildlife, of which definite instances are cited for songbirds in Ohio, and for the Hungarian partridge, pheasant, bob-white, and waterfowl in Minnesota. Eighty percent of the farmers in the Caledonia project regarded the work as beneficial to wildlife. There is some comment also on farmer-sportsman relationships.

Management: Soil conservation in relation to wildlife conservation

Van Dersal, Wm. R. Environmental improvement for valuable non-game animals, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 200-202.

Wildlife is a product of the land and as patterns of land-use change, so do wildlife populations. As 85 percent of the land of the United States is in agricultural use, it follows that wildlife management rests largely in the hands of farmers. As a rule they are not specifically interested in game production, but by practicing environmental improvement of value to themselves, they indirectly benefit wildlife--in its natural proportions, chiefly non-game. These species themselves are largely beneficial through consumption of insect and other pests. The author cites examples of soil conservation practices that have directly benefitted wildlife. Among them are: Strip-cropping, excluding grazing livestock from woodlands, and maintenance of hedgerows; others are more briefly mentioned. "As long as wildlife conservation can be so combined with other land uses as to make it necessary to practice for other reasons than wildlife production, then whether or not wildlife is of immediate interest to the landowner makes little difference--wildlife is still produced."

"If it ever becomes possible to appraise any given situation in terms of benefits accrued above the cost of wildlife management--and this in terms of cash, not words--perhaps landowners may undertake management measures aimed solely at wildlife production and nothing else. But until that time comes the economic establishment of wildlife production on most of the land in the United States must depend upon its integration with and contribution to agriculture."

Management: Stocking, turkey

Hopkins, Frank. The wild turkey problem in Wisconsin, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 5(12), Dec. 1940, pp. 47-48, 1 table.

In 10 years nearly 3,000 pen-raised wild turkeys were stocked but the birds flocked to farms and became nuisances. They were not wary enough to protect themselves from predators and hunters. Stocking has been discontinued.

Management: On stripped areas

Yeager, Lee E. Wildlife management on coal stripped land, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 348-353, 1 pl., 1 table.

Stripped areas comprising a considerable acreage in mid-western States are difficult to revegetate. Several tree and shrub pioneer invaders are listed; the first important upland herb is white sweetclover; other early comers are mentioned. Cattails, muskgrasses, and waterweed are first to establish themselves in aquatic habitats. As the successions mature, animal life is attracted and increases. On black prairie, the older mined areas (15-30 years) may support larger game populations than nearby farms but the reverse is true of mines contrasted to good natural habitat. Overgrown stripped areas have sanctuary value. Management suggestions are made.

Management: Waterfowl

Cartwright, B. W. Restoration of waterfowl habitat in western Canada, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 377-382.

Notes on impoundment of water, excavation of ponds, fencing, guarding, and other activities for improvement of wild fowl habitat. The work has been applied to 530,000 acres. Statement of support and cooperation.

Management: Winter feeding

Fox, Adrian C. Winter feeding for game birds (State Game and Fish Department, Bismarck, N. Dak.), 16 pp. (5-3/8 x 8-1/8), illus.

Wildlife in North Dakota often needs artificial feeding. Natural foods and deficiencies in food and cover are discussed. Feed patch recommendations are made and feeding stations described and liberally illustrated. Care of stations, advantages of feeding, and available literature also are treated.

Natural History: Tundra animals

Shelford, V. E., and A. C. Twomey. Tundra animal communities in the vicinity of Churchill, Manitoba, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 22(1), Jan. 1941, pp. 47-69, 16 figs., 7 tables.

General ecological account in which vertebrates receive consideration. The tundra vegetation presents a minimum of shelter for animals. The larger forms tend to invade all stages of the biome. Bibliography of 68 titles.

Predation: Crow-waterfowl relationships

Hammond, Morrill C. Crow-waterfowl relationships on Federal refuges, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 398-404, 2 figs., 1 table.

Summary of observations by Kalmbach, the author, and a number of refuge managers. A table records the percentages of early and late nest destruction at 3 localities in various years. On 16 owned, and 70 easement, refuges, nest losses through crow predation varied from 0 to 30 percent. Destruction varied almost directly with the number of nests available. Quality of nesting cover did not seem to be an important factor. At not more than 8 of the refuges was duck-nest predation by crows looked upon as important. Mallard and redhead nests appeared to be the most vulnerable, and in general the greatest damage was done during the laying period. Bibliography of 9 titles.

Predation: On fishes

Hubbs, Carl L. Predator control in relation to fish management in Alaska, Trans. Fifth N. A. Wildlife Conference 1940 (1941) (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 153-162, 4 photos.

A difficulty with bounty payments in Alaska is that the natives come to regard them as vested interests and demand their maintenance and even extension. Birds and mammals mentioned by the author include: Gulls, terns, fish ducks, the bald eagle, hair seal, and bears. None are regarded as materially injurious in relation to Alaskan fisheries. Most eating of salmon ova is of loose eggs that would be lost anyway; there is little chance of any egg hatching that is not buried in gravel, and few of these are taken by predators. "Predator control seems always destined to bring conflicting wildlife interests into clash. Administrative decision should therefore rest on a full understanding of all points of view, and on all facts which can be determined by impartial and penetrating research."

Propagation: Preventing flight

Schroeder, Chas. R., and Karl Koch. Preventing flight in birds by tenotomy, Journ. Amer. Vet. Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 97(761), Aug. 1940, pp. 169-170, 4 figs.

Citation of 6 publications dealing, at least in part, with control or prevention of flight in birds, and description and illustration of a new method--severing by cautery of a tendon at the wrist joint. The operation is simple, sterile, and produces no hemorrhage or other undesirable results.

Research: Hair identification

Hardy, J. I., and Thora M. Plitt. An improved method for revealing the surface structure of fur fibers, U. S. Dept. of the Interior, Wildlife Circ. 7 (Supt. of Documents, Washington, D. C. 5 cents a copy), 10 pp., 3 pls., 1940.

Review of the development in methods of studying hair; that of the authors described; characteristics of the surface markings of hairs discussed and illustrated for those of the mink, silver fox, muskrat, and beaver. Bibliography of 18 titles.

Authors' summary: "Impressions of the external structure of whole fibers can be quickly obtained with a few simple materials. The imprints are made on thermoplastic film that softens slightly below 100° C. Ordinary clamps hold the fibers and film firmly together while they are heated in a laboratory oven for about 15 minutes. The imprints are readily examined under the microscope and identified by comparison with known samples. The minute changes in the surface of a fur fiber, as they may be affected by feeding, breeding, and management, may be followed throughout its entire period of growth. Examination of fibers for identification in studies in agriculture, industry, criminology, and forensic medicine is considerably facilitated."

Research: Illinois

Frison, Theodore H. A report of the Natural History Survey, Ann. Rep. Illinois Dept. of Registration and Education (Springfield, Ill.), 1939-40, Reprint separately paged, 1-27, illus.

A map shows the location of field stations and study areas; the expanded wildlife program is described; and separate discussions are given of upland game studies, rabbits and tularemia (485 human cases reported in 1939), and of waterfowl and fur animal investigations.

Research: Illinois

Frison, Theodore H. Enemies of natural wealth yield as science rebuilds resources, Blue Book State of Illinois, 1939-1940, pp. 480-501, illus.

Section headings indicative of contents are: Hedgerows are important to agriculture and wildlife, prairie chickens increase in areas seeded to redtop, Illinois leads in investigation of migratory ducks, Pittman-Robertson program involves important resources, seek to correlate game and farming practices, and new laboratories to develop game and fish. A list of both official and unofficial publications prepared by the staff that appeared 1937-39 is given.

Probably the best place to apply for both this and the preceding publication is the State Natural History Survey, Urbana, Ill.

Research: Live trap

Johnson, M. W. A simple "live" trap, Science (Lancaster, Pa. 15 cents a copy), 92(2395), Nov. 22, 1940, p. 490, 1 fig.

Made from an ordinary snap trap, a cigar box, string, and rubber band; total cost 5 cents.

U. S. Government: Interior Department

Ickes, Harold L. Annual Report of the Secretary of the Interior for the fiscal year ending June 30, 1940 (Supt. of Documents, Washington, D. C. 75 cents a copy), xxxi+528 pp., illus.

Embraces reports of all the constituent agencies as well as that of the Secretary, proper. Sections relating to terrestrial wildlife are: Letter of Transmittal by the Secretary. Bureau of Biological Survey, pp. xii-xiii. Notes on reorganization, appropriations, refuge system, increase in wildlife incident to the defense movement. The nation "must prudently conserve this great natural resource as one of the American requirements for good living."

National Park Service. Arno B. Cammerer. Wildlife studies and management, pp. 179-181. Note on transfer of the Wildlife Division to the Biological Survey. Prey-predator ecology continued to be the major research project but numerous other activities are mentioned. Management consisted chiefly in regulating various herds of big game to the capacity of their environment.

Bureau of Biological Survey. Ira N. Gabrielson. pp. 223-290. Fifty-fifth annual report of this organization and last under the name cited. Changes resulting from executive reorganization are fully explained; they leave the Federal Government in better position than ever before to carry on the work of wildlife restoration. The general status of wildlife and its conservation are summarized and outstanding events of the year are noted in 25 brief paragraphs. The report contains the usual comprehensive statement of the work of the Survey which is so succinct as to be almost of abstract character in itself. Some of the more important parts are: An analysis of the waterfowl situation (increase 1935-1940, 27 to 65 million ducks, geese, and swans); summary of the work of the cooperative wildlife research units;

progress in Federal aid in wildlife restoration (237 projects under way); status of the national wildlife refuge program (263 refuges totalling more than 13-1/2 million acres); control of injurious animals; and conservation in Alaska.

Bureau of Fisheries. Charles E. Jackson. Alaska fur-seal service, pp. 303-306. Number of seals (more than 2,000,000), take of sealskins, and manufacturing of by-products; also notes on the fox industry of the Pribilof Islands and protection of sea otters, walruses, and sea lions.

Grazing Service. R. H. Rutledge. Wildlife, pp. 346-347. Cooperation in adjustment of livestock and wildlife interests.

Civilian Conservation Corps. Conrad L. Wirth. Wildlife conservation, pp. 406-407. Summary of work of an average of 35 camps on Biological Survey projects, that on the Savannah River Refuge particularized.

U. S. Government: Wildlife Service, Federal aid

Rutherford, R. M. Wildlife restoration through State and Federal cooperation under the provisions of the Pittman-Robertson Act, Journ. Forestry (Mills Bldg., 17th St. & Pennsylvania Ave., N. W., Washington, D. C. 50 cents a copy), 39(2), Feb. 1941, pp. 157-160.

Nature of the act, source of funds, manner of their distribution. Forty-four States are actively participating and in the first two and one-quarter years of operations, 341 projects were approved. Illustrative undertakings are described. Land purchase, development, research, and survey activities are included, some of which involve cooperation between States. It is planned to publish reports upon all investigations.

WILDLIFE LEAFLET

An issue of interest to wildlife managers additional to those previously mentioned is listed below. Copies of these mimeographed leaflets can be obtained from the Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C.

176. Animal and plant resources of Alaska, by L. J. Palmer, 12 pp., January 1941.

General account of Alaska as a home for wildlife, its fauna and flora, depletion of wildlife, importance of this resource, and the need for management, with notes on the present administration of wildlife and upon investigations in progress.

NOTES AND NEWS

"The Reporter" published in the interests of conservation education by the National Wildlife Federation (1212 Sixteenth St., N.W., Washington, D. C.) made its first appearance January 15, 1941. It has appeared monthly since that time; no subscription price has been announced.

As a special supplement to its Quarterly Report, the Colorado Game and Fish Commission (Denver) has published a 13-page mimeographed leaflet entitled "A New Method for Computing Range Capacity for Herbivorous Big Game Animals and Correlation of Range Use between Domestic Livestock Use and Game Use." It recounts the history of the deer-elk survey and the difficulties experienced with existing systems of range appraisal, and discusses a weight of food per acre method that is being tested. The food requirements per day of a deer, cow, horse, and sheep are estimated and a formula given for computing carrying capacity of range. This preliminary account of the method has been issued so that others may try it. Further report in more permanent form is contemplated

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Mimeographed copies of the papers given at the 1940 New England Game Conference can be had from the Massachusetts Fish and Game Association (20 Spruce St., Boston. 25 cents for a set of 33). Those coming within the scope of WILDLIFE REVIEW are listed and briefly annotated below.

Seamans, Roger A. "A brief description of Vermont's Pittman-Robertson projects," 5 pp.

Mostly advance discussion of a study in fluctuations of game populations, and preliminary report on a survey of deer weights and measurements.

Aldous, Clarence M., and Howard L. Mendall. "Woodcock and weather," 5 pp.

Notes on probably the most unfavorable twelve months of weather the woodcock has had to endure. The results will not be fully known until the breeding censuses of 1941 are made.

Edminster, F. C. "Soil conservation districts. A medium for practical wildlife management and landowner-sportsman cooperation," 6 pp.

About the same material as abstracted in WILDLIFE REVIEW, No. 27, May 1940, p. 25.

Bishop, James S. "Pittman-Robertson projects under way in Connecticut, 2 pp.

Plans for a sanctuary development project and for a study of the effect of forest management practices upon ruffed grouse.

Miller, J. Paul. "Administration of the Pittman-Robertson Act," 3 pp.

Cooperation by the States; make-up and functions of the staff for administering the act; nature of acceptable projects; ineligible States; record in the northeast.

Whaley, Chester T. "Feleral aid in Rhode Island," 3 pp.
Report of progress on game management on a typical abandoned farm. Surprisingly, the predator problem proved of major importance.

Gashwiler, Jay S. "Waterfowl research in Maine under the Pittman-Robertson Act," 2 pp. (our copy incomplete)
One season's results of a habitat survey summarizing the findings as to aquatic plant resources and upon the nesting results for 143 broods of wild ducks.

Marsh, Joel W. "Research development, duck food and cover planting in the State of Maine, 1939-40," 5 pp.
Notes on quantities of material and methods used in both spring and fall planting of aquatic species; also on collecting various parts for propagation, and the cost.

Gould, Ernest W. "The New Hampshire Pittman-Robertson program," 3 pp.
Preliminary statements on studies of pheasants and ruffed grouse.

Howland, Kenneth C. "Education in American conservation," 6 pp.
The success of conservation depends upon thorough education of the people as to its needs, aims, and importance. Various media for publicizing conservation are mentioned and of all of them the author has most faith in the public school system. Opinions in support of this position are quoted, the present state of conservation education in the schools is outlined, and suggestions made for progress.

Hagar, J. A. "Pittman-Robertson development in Massachusetts," 3 pp.
Report of progress on studies in the restoration of black ducks and Canada geese, on experimental management of woodland sanctuaries, and upon a farm-game research project.

Adams, W. C. "Pittman-Robertson program in New York State," 3 pp.
Outline of projects, four of which are classed as research, two as acquisition and construction, and two as management.

Miller, J. Paul. "The relationship of the Federal Aid in Wildlife Restoration projects to the colleges in the northeast," 2 pp.
Opportunities of the colleges in training wildlife specialists and of employment for the latter in the restoration program.

Williamson, Leslie A. "Regulated private shooting preserves in Connecticut," 5 pp.
The same article as abstracted on pp. 32-33 of this issue of WILDLIFE REVIEW.

MacNamara, L. G. "Deer damage and management in the pine region of New Jersey," 6 pp.
Having been extirpated, deer were re-introduced as early as 1904; an open season beginning in 1909 has yielded steadily larger bags up to some 2,300 head in recent years. The principal problem connected with the animals

is damage to farm crops. The average farm is a clearing surrounded by woodland--conditions making damage almost certain. Complaints have been on the increase and in 1939 were carefully investigated. The findings are tabulated. Results of tests of repellents, flash guns, electrified and other fences, in control are reported--none were very satisfactory. Feed patches as a counter-attractant to crops show promise.

Morton, G. H. "Outline of deer investigation in New York and the northeast," 3 pp.

Plans of this investigation as an illustration of the manner in which research projects are organized in New York.

Seamans, Roger A. "Special phases of life history of deer in Vermont," 3 pp.

History of deer in the State since restocking was begun in 1878. In 1939 the total known kill was 3,159. Damage to crops is regular and is reimbursed by the State to the extent of about $3,000 annually. Electrified fences have proved both successful and unsuccessful in reducing depredations. Notes are given on tests of repellents, of which kerosene flares were most effective.

Gould, Ernest M. "Pheasant studies in southern New Hampshire," 4 pp.

Analysis of predation; the fox was most destructive and most kills were made in roosting cover. Cover types and territoriality are discussed. Of 131 eggs recorded, 79 hatched; the mortality of chicks was 82 percent. The causes of loss are detailed. The nature, scope, and results of cover and feed patch plantings are summarized. The average cost of producing 100 pounds of seed was $3.38. Despite the plantings, feeding was necessary after the middle of January.

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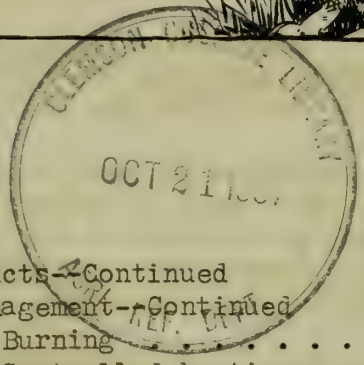
WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE FISH AND WILDLIFE SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR



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Washington, D. C. No. 31 June, 1941

Classification: Deer, Black-tailed

Longhurst, Wm. M., and John E. Chattin. The burro deer Odocoileus hemionus eremicus, California Fish and Game (Terminal Island, Calif.), 27(1), Jan. 1941, pp. 2-12, 3 figs., 1 table.

This deer inhabits only the lower Colorado River region in the United States. On a hunt to collect specimens for comparative purposes, observations were made on its habits; its chief food at the time was a grass (Hilaria rigida). Comparisons are made in text, table, and figures, of characters of this and 5 other subspecies.

Conservation: Bird protection

Collinge, Walter E. Weather, wild birds, and home-grown food, Nature (Macmillan & Co., St. Martin's St., London, W.C. 2, England. One shilling a copy), 147(3722), March 1, 1941, pp. 267-268.

Calls attention to reduction in birds generally by severe winters, the latest of which was that of 1939-40. Based on experience in 1918, the writer predicts increased damage by insects and rodents, and suggests prohibition of the taking of any wild birds or their eggs (house sparrow, starling, and wood pigeon, excepted) until the end of 1942.

Conservation: Pan-American

Colom, Jose L. Pan American policy for nature protection/(1624 H St. N.W., Washington, D. C.), National Parks Bulletin 15(69), Feb. 1941, pp. 5-13, 10 photos, 1 map.

This article relates to the convention referred to in WILDLIFE REVIEW, No. 29, January 1941, pp. 54-55. The convention is reproduced in full and comment upon it is quoted from Hector Castro, Minister of El Salvador, and from Newton B. Drury, Ira N. Gabrielson, and C. E. Rachford, heads of Usonian Federal conservation organizations. The author traces the history of the agreement that has now been signed by plenipotentiaries of 15 countries. While lack of organizations to enforce conservation and the difficulties of the present international situation may postpone realization of the benefits sought by the treaty, the author believes that Pan American conservation is definitely on its way and that satisfactory results will in time be attained.

Control: Hare, Snowshoe

Deerwester, Therman. Cooperative snowshoe hare control project, Wisconsin Conservation Bulletin (Wisconsin Conservation Department, Madison), 6(4), April 1941, pp. 19-20.

The Forest Service, Biological Survey, and State Conservation Department were the original cooperators on work begun in 1938 to control damage to planted evergreens. Destruction varies with the cyclic abundance of the hare and is serious during the latter half of the upswing. Use of a sprayed-on

repellent, while effective, was impracticable because of the expense involved in renewing the application annually. Of aggressive measures, snaring proved both effective and economical. Hare control may serve to assist in moderating the cycle and providing a more constant population for greater lengths of time.

Destruction: Highway mortality

Hein, Edward N. Gunless killing, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 6(2), Feb. 1941, pp. 24-26, 1 table.

Number of animals, including domesticated kinds, killed on two highways in 12 and 10 months, respectively. In both instances, rabbits furnished the greatest number of victims.

Destruction: Highway mortality

Stoner, Dayton. Bird casualties on the highways, University of the State of New York (Albany), Bul. 27(7), March 1941, pp. 229-232, 1 photo.

Mainly notes on animals seen dead along highways in four round trips from Albany, N. Y., to Iowa City, Iowa. Birds totalled 1,781 out of 2,975 freshly killed vertebrates. Suggestions are made as to use of some of the victims for biological specimens.

Destruction: Pheasants by winter storms

Carlson, C. Edward. Pheasants and the past winter, Conservation Volunteer (Minnesota Department of Conservation, St. Paul), 2(9), June 1941, pp. 47-50.

Description of two unprecedented storms and of the destruction they caused among pheasants. On one census area the birds were reduced from 50 to 29 per square mile. Despite this loss, the number of pheasants going into the nesting season compares favorably with that of 1939 which proved to be a successful hunting year.

Destruction: Waterfowl

Rysgaard, G. N. A short history of waterfowl, Conservation Volunteer (Minnesota Department of Conservation, St. Paul), 2(9), June 1941, pp. 75-79.

Effects of drainage, drought, botulism, lead poisoning, and shooting, as affecting the total, and the Minnesota, populations. A low was reached in 1935. There has been some increase but at the rate of a 5 percent annual increase, it would require 14 years to restore the population to 50,000,000 birds, one-half of that of 1930, which was considered dangerously low.

Diseases and Parasites: Acanthocephala, Centrorhynchus

Van Cleave, Harley J., and Edna M. Pratt. A new species of the genus Centrorhynchus (Acanthocephala) from the barred owl, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(4), Aug. 1940, pp. 297-300, 1 pl.

C. conspectus n. sp., North Carolina, described and illustrated. Key to 3 N. A. species of the genus. Bibliography of 6 titles.

Diseases and Parasites: Acarina, Entonyssus

Schmidt, Fred L. Entonyssus vitzthumi (Acarina), a new ophidian lung mite, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(4), Aug. 1940, pp. 309-313, 1 pl.

From a bull snake, Oklahoma; description; illustration. Bibliography of 8 titles.

Diseases and Parasites: Acarina, Ornithodoros

Cooley, R. A., and Glen M. Kohls. Three new species of Ornithodoros (Acarina: Ixodoidea), U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 56(12), March 21, 1941, pp. 587-594, 2 pls., 2 figs.

O. cromicus from Peromyscus maniculatus, Utah; and O. stageri and O. yumatensis from bat caves in southwestern States.

Diseases and Parasites: Acarina, Ornithodoros

Cooley, R. A., and Glen M. Kohls. Further new species of Ornithodoros from bats (Acarina: Argasidae), U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 56(17), April 25, 1941, pp. 910-914, 1 pl., 3 figs.

O. concanensis, Texas and Arizona; O. kelleyi, Utah and Colorado.

Diseases and Parasites: Blood parasites

Nelson, E. Clifford, and Jay S. Gashwiler. Blood parasites of some Maine waterfowl, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 199-205, 2 tables.

Authors' abstract: "The major objective of this survey was a study of the prevalence of Leucocytozoon. Blood smears were obtained from waterfowl live-trapped during banding operations. In all, smears were obtained from 130 individuals of nine species. Leucocytozoon was found in 59% of 77 wood ducks and 89% of 29 black ducks. These birds came from the same area so perhaps black ducks are more prone to infection than wood ducks. No birds under

two weeks of age were found infected but all of the ducklings from three to seven weeks of age were infected. Additions to the list of hosts recorded for Leucocytozoon are the wood duck, American merganser, hooded merganser, American golden-eye, and green-winged teal. Haemoproteus was found in 64% of 77 wood ducks and 20% of 29 black ducks which may indicate that wood ducks are more prone to this infection. Haemoproteus was also found in ring-necked ducks and coots. Ring-necked ducks, wood ducks, and coots are additions to known hosts of this parasite. Microfilaria was found in 38% of the wood ducks and 31% of the black ducks, one of six ring-neck ducks, one of three hooded mergansers, one green-winged teal, and one of two coots. Three different types of microfilariae were found. The adult worms were not collected. No parasites were found in two lesser scaups. Bibliography of 11 titles.

Diseases and Parasites: Cestoda

Hughes, R. Chester, John R. Baker, and C. Benton Dawson. The tapeworms of reptiles. Part 1. American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 25(2), March 1941, pp. 454-468.

Key to the principal taxonomic groups and synonymic catalog of the species with host and locality records.

Diseases and Parasites: Cestoda, Tatria

Schultz, Richard L. Some observations on the amabiliid cestode, Tatria duodecacantha Olsen, 1939, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(2), April 1940, pp. 101-103, 1 pl.

Pied-billed grebe, Oklahoma. Key to 5 species of Tatria, that mentioned in title illustrated by 7 figures. Bibliography of 5 titles.

Diseases and Parasites: Diptera, Cuterebra

Knipling, E. F., and A. L. Brody. Some taxonomic characters of cuterebrine (Diptera) larvae, with larval descriptions of two species from Georgia, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(1), Feb. 1940, pp. 33-43, 2 pls.

Life history and habits; larval structure described and illustrated for Cuterebra buccata from the cottontail, and C. cuniculi from the marsh rabbit.

Diseases and Parasites: Encephalomyelitis

Beaudette, F. R., J. J. Black, and C. B. Hudson. Another case of equine encephalomyelitis in New Jersey pheasants, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 98(771), June 1941, pp. 449-451, 1 fig., 1 table.

In captive birds; lesions, history of outbreak, comment on possible sources of infection.

Diseases and Parasites: Encephalomyelitis

Sellards, Andrew W., Ernest E. Tyzzer, and Byron L. Bennett. The infection of birds with the virus of equine encephalomyelitis, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 a copy of a single section), 33(2), March, Section B, pp. 63-68.

Authors' summary: "The virus of equine encephalomyelitis recovered from pheasants dying in Connecticut was found to conform in its various characteristics with an eastern equine strain without evidence of any peculiarities attributable to its avian origin. A fatal paralysis developed in several adult pheasants after intramuscular injection. Very young chicks died within 48 hours after subcutaneous injection; young hens remained free of symptoms even after intracerebral inoculation but their serum developed protective properties." Bibliography of 15 titles.

Diseases and Parasites: Encephalomyelitis

Syverton, Jerome T., and George P. Berry. The transmission of equine encephalomyelitis to the western burrowing owl, Spectyto cunicularia hypogaea (Bonaparte), Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 a copy of a single section), 33(2), March, Section B, pp. 37-41, 1 chart, 1 table.

Experimentally susceptible; the paper contains references to findings with respect to numerous other birds and mammals. Bibliography of 18 titles.

Diseases and Parasites: Helminths of Australia

Young, May R. Helminth parasites of Australia, Imperial Bureau of Agricultural Parasitology (St. Albans, England. 10 shillings, 6 pence a copy), 145 pp., 1939.

Bibliography, host index, catalogue of parasites, and also a list of free-living nematodes.

Diseases and Parasites: Lead poisoning

Nord, Warren H. A technique for removing lead from the gizzards of living waterfowl, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 175-179, 1 pl., 1 fig.

Author's abstract: "An apparatus utilizing vacuum for the removal of lead shot from the proventriculus and gizzard of living waterfowl is described. Water is the transporting medium administered by a tube surrounding the suction or vacuum tube which is inserted through the oral opening into the gizzard. Debris and shot are collected in a vacuum reservoir. As high as 26 shot have been removed from a single mallard. Proper food and shelter following shot removal are recommended, and use of the apparatus for food preference collections is suggested."

Diseases and Parasites: Myiasis

McLean, Donald D. The screw-worm fly, California Conservationist (306 State Office Bldg., Sacramento, Calif. 15 cents a copy), 6(2), Feb. 1941, pp. 11, 20, 21.

Description of stages of this dipteron; range of infestation; species infected (several wild); notes on cases of deer infestation; 190 head of deer known to have died from myiasis in a year.

Diseases and Parasites: Nematoda

Reelfoot Lake, Tennessee,

Reiber, Robert J. Nematodes of amphibia and reptilia. I./ Rep. Reelfoot Lake Biol. Sta. (Tennessee Academy of Science, Nashville), 5, Jan. 1941, pp. 92-99.

Annotated list of 14 species, with host index and bibliography of 14 titles.

Diseases and Parasites: Nematoda

Walton, A. C. Amphibian nematodes from the Gaspe Peninsula and vicinity, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(1), Feb. 1941, pp. 59-61, 1 fig.

Host records for 7 species of which one, Spironoura rankini from Rana clamitans, is described as new and illustrated.

Diseases and Parasites: Nematoda, Ascaridia

Wehr, Everett E. A new intestinal roundworm from the ruffed grouse (Bonasa umbellus) in the United States, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(5), Oct. 1940, pp. 373-376, 1 pl.

Ascaridia bonasae n. sp., northeastern States and Canada; description, illustration; key to 3 species; bibliography of 12 titles.

Diseases and Parasites: Nematoda, Lungworms in deer

Goble, Frans Cleon. Tissue changes in white-tailed deer (Odocoileus virginianus borealis) accompanying natural infections of lungworms (Genera Protostrongylus and Dictyocaulus), Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 141-158, Pls. 9-14.

Author's abstract: "Microscopic studies were made of tissues of 20 northern white-tailed deer, 14 of which had natural lungworm infections. Changes attributable to Dictyocaulus infestation were due chiefly to the presence of adults in the bronchi while Protostrongylus coburni infestation resulted in changes due to the presence of eggs and newly hatched larvae in

the alveoli. Extensive lymphocytic reaction to the latter is accompanied by atalectasis and interstitial pneumonia. Fourth stage larvae of Protostrongylus may be trapped as they arrive in the lung via the blood and embolized. They are encircled by eosinophiles and agranulocytes to form nodular lesions that are walled-off and may eventually scar or calcify. This prevents completion of the life cycle and suggests a possible mechanism of immunity. The relationships between the various factors implicated in winter losses of deer, i.e. lungworms, bacteria, malnutrition, and exposure, are discussed in the light of the histopathological findings." Bibliography of 32 titles.

Diseases and Parasites: Nematoda, Onchocerca

Annereaux, R. F. A new record of a deer parasite for California, Amer. Journ. Veterinary Research (600 S. Michigan Ave., Chicago, Ill. $1.25 a copy), 2(3), April 1941, pp. 199-201, 1 pl.

List of cattle and sheep parasites that have been reported from deer. Description and illustration of Onchocerca cervipedis, a nematode that may cause lameness in deer.

Diseases and Parasites: Nematoda, Oswaldocruzia

Walton, A. C. Oswaldocruzia minuta n. sp. (Nematoda) from Acris gryllus, Amer. Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 25(2), March 1941, pp. 418-419, 3 figs.

Description, measurements, illustrations, comparative notes. Indiana.

Diseases and Parasites: Plague

Anon. Plague infection reported in the United States during 1940, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 56(9), Feb. 28, 1941, pp. 399-400, 1 table.

Reported from 5 western States; found for the first time in Park County, Wyoming. The tabulation of 17 records shows locality, date, and species of rodents involved.

Diseases and Parasites: Plague

Eskey, C. R., and V. H. Haas. Plague in the western part of the United States, U. S. Public Health Bul. 254 (Supt. of Documents, Washington, D. C. 20 cents a copy), v+83 pp., 61 figs., 28 tables, 1940.

The first case of human plague in the United States was reported at San Francisco in 1900. Within a few years, ground squirrels of the vicinity were infected. Despite attempts at eradication, the disease persists among rodents in the vicinity of San Francisco Bay and has spread rather generally over the western States. Ground squirrels, wood rats, and prairie dogs appear to be the groups chiefly responsible for the maintenance and extension of plague. Details are given of rodent infestations. Flea investigations and

demonstration of plague infection by inoculation of parasites also are fully treated.

Diseases and Parasites: Protozoa

Coatney, G. Robert, and Wm. L. Jellison. Some blood parasites from Montana birds, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(2), April 1940, pp. 158-160, 1 table.

Occurrence of Haemoproteus, Leucocytozoon, Plasmodium, and Microfilaria in the magpie, crow, Swainson's hawk, and great horned owl.

Diseases and Parasites: Protozoa

Hewitt, Redginal. Haemoproteus metchnikovi (Simond, 1901) from the yellow-bellied terrapin (Pseudemys elegans), Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(4), Aug. 1940, pp. 273-278, 1 pl., 1 table.

Maryland. Description, illustration, discussion and tabulation of related blood parasites from turtles of the world. Bibliography of 7 titles.

Diseases and Parasites: Protozoa, Copramoeba

Lobeck, Elizabeth A. Entamoeba pyrrhogaster n. sp., with notes on other intestinal amoebae from salamanders, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(4), Aug. 1940, pp. 243-272, 6 pls.

The only matter wholly applicable to the United States is an informal (but probably valid) description of Copramoeba salamandrae as a new species from the newt (Triturus viridescens) from Massachusetts. Bibliography of 23 titles.

Diseases and Parasites: Protozoa, Trichomonas

Levine, Norman D., L. E. Boley, and H. R. Hester. Experimental transmission of Trichomonas gallinae from the chicken to other birds, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 a copy of a single section), 33(1), Jan. 1941, Section C, pp. 23-32, Pl. 1.

Authors' summary: "(1) Trichomonas from the upper digestive tract of the chicken has been transmitted by feeding cultures of the protozoon to the turkey, bobwhite quail, canary, and English sparrow. In these birds characteristic lesions were produced; (2) a light infection without lesions was similarly produced in one out of eleven ducklings; (3) an unsuccessful attempt was made to infect two ring-neck pheasants and a starling by feeding cultures of the Trichomonas; (4) in view of the similarity of morphology in a variety of natural hosts and ease of transmission from one natural host to any other and to many species of birds in which natural infections have not been found, it

is apparent that all the trichomonads so far reported from the upper digestive tract of birds belong to a single species, Trichomonas gallinae." Bibliography of 46 titles.

Diseases and Parasites: Siphonaptera

Fox, Irving. Siphonaptera from western United States, Journ. Washington Acad. Sci. (W. W. Diehl, U. S. Bureau of Plant Industry, Washington, D. C. 50 cents a copy), 30(6), June 1940, pp. 272-276, 1 pl.

Description and illustration of 3 new species of fleas from rodents, one representing a new subgenus. Corypsylloides spinata, meadow mouse, Oregon; Amphipsylla neotomae, wood rat, California; Dactylopsylla (Spicata) rara, pocket gopher, Colorado.

Diseases and Parasites: Siphonaptera

Freeman, R. B. The distribution of Orchopeas wickhami (Baker) (Siphonaptera), in relation to its host the American grey squirrel, Entomologist's Monthly Magazine (N. Lloyd & Co. Ltd., Burrell Street Works, Blackfriars, London, S.E. 1, England. 2 shillings a copy), 77(4), April 1941, pp. 82-89, 1 pl. (map), 1 table.

Author's summary: "The flea O. wickhami Baker was first recognized in Britain in 1924. It is more or less specific to the American grey squirrel (Sciurus carolinensis Gmelin). A list of the known records is given. Introduced with the squirrel at Woburn, Beds., in 1890 and probably with other American introductions, it has been found in several isolated centres to which the squirrel has been taken from these original colonies. In certain areas it has not been found, though looked for, and such absence may be attributed to absence from the original squirrel stocks from which these areas have been colonized rather than to any physical factors making such areas unsuitable. The percentages of infestation and flea index for all species of fleas are related to the breeding cycle of the squirrel. The grey squirrel is also parasitized by Monopsyllus sciurorum (Schrank), the usual flea of the indigenous red squirrel (S. vulgaris L.) and several bird and mammal fleas; these are often found whether O. wickhami is present or not. A list of such records is given." Bibliography of 20 titles.

Diseases and Parasites: Siphonaptera

Kohls, Glen M. Siphonaptera: A study of the species infesting wild hares and rabbits of North America north of Mexico, U. S. Public Health Service, Bul. 175 (Supt. of Documents, Washington, D. C. 20 cents a copy), 26 pp., 3 pls., 8 maps, 1940.

Key to the families, genera, species and subspecies of fleas known from nearctic hares and rabbits; with text giving their synonymy, distribution, and host records; and illustrations of flea characters and maps outlining the ranges of the hosts and these parasites. Two-page bibliography.

Diseases and Parasites: Trematoda

Parker, Malcolm V. The trematode parasites from a collection of amphibians and reptiles, Rep. Reelfoot Lake Biol. Sta. (Tennessee Academy of Science, Nashville), 5, Jan. 1941, pp. 27-41, 1 pl.

Report on studies of collections from Tennessee, Georgia, and Florida. The material included "six families, seven subfamilies, 17 genera, and 36 species of digenetic trematodes, of which the following six species are considered new to science: (1) Ophioxenos singularis, (2) Lechriorchis insignis, (3) Neoronifer claphis, (4) Paralechriorchis syntomenteroides, (5) Cercorchis reelfooti, and (6) Stomatrema faranciae. Twelve of the host records represent species reported for the second time in the literature. Approximately 24 new host records are given for various species of flukes. On the basis of the shape of the excretory bladder, the genus Stomatrema has been placed provisionally in the family Haplometridae McMullen, 1937, while the genus Cercorchis is retained in the family Reniferidae Baer, 1924. The status of the family Brachycoeliidae S. J. Johnston, 1912, remains doubtful, but the family is retained pending more definite information. The evidence found in the present study is opposed to any attempt to synonymize the various North American species of Brachycoelium." Bibliography of 29 titles.

Diseases and Parasites: Trematoda, Acanthatrium

Macy, Ralph W. Description of three new trematodes with notes on other species of Acanthatrium (Lecithodendriidae), and a key to the genus, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(4), Aug. 1940, pp. 279-286, 2 pls., 1 fig.

Key to 8 species; 3 from bats of the United States described as new. Bibliography of 7 titles.

Diseases and Parasites: Trematoda, Euparyphium

Beaver, Paul C. Studies on the life history of Euparyphium melis (Trematoda: Echinostomidae), Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(1), Feb. 1941, pp. 35-44, Pl. 44.

Description and illustration of the stages of this parasite, the adult of which has been recorded from the mink. Bibliography of 13 titles.

Diseases and Parasites: Trematoda, Leptophyllinae

Byrd, Elon E., Malcolm V. Parker, and Robert J. Reiber. A new genus and two new species of digenetic trematodes, with a discussion on the systematics of these and certain related forms, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(2), April 1940, pp. 111-122, 1 pl.

Paurophyllum new genus, P. simplexus n. sp., genotype, from the Florida king snake; and P. megametricus n. sp., from the cottonmouth, both from

Florida, described and illustrated. Discussion of the genus Leptophyllum and proposal of a subfamily Leptophyllinae to contain it and the new genus. Bibliography of 14 titles.

Diseases and Parasites: Trematoda, Myotitrema

Macy, Ralph W. A new trematode, Myotitrema asymmetrica, n.g., n. sp. (Lecithodendriidae) from the little brown bat, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(1), Feb. 1940, pp. 83-84, 1 fig.

Minnesota. Bibliography of 5 titles.

Diseases and Parasites: Trematoda, Reniferidae

Wharton, G. W. The genera Telorchis, Protenes, and Auristomum (Trematoda: Reniferidae), Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(6), Dec. 1940, pp. 497-518, 1 pl., 3 tables.

Diagnoses and revisions, illustrated; key to 30 species of Telorchis and synopsis giving synonyms, descriptive notes, names of hosts (reptiles and amphibians). Each of the other genera is held to contain only a single species. Two-page bibliography.

Diseases and Parasites: Trematoda, Rhytidodoides

Smith, G. M., C. W. Coates, and R. F. Nigrelli. A papillomatous disease of the gallbladder associated with infection by flukes, occurring in the marine turtle, Chelonia mydas (Linnaeus), Zoologica (New York Zoological Society, 630 Fifth Ave., New York), 26, 1(5), May 1941, pp. 13-16, 4 pls., 1 fig.

Notes on other flukes of this and related turtles; description and illustrations of Rhytidodoides similis and the lesions it causes.

Diseases and Parasites: Trematoda, Spirorchis

Wall, Limas D. Life history of Spirorchis elephantis (Cont. 1917), a new blood fluke from Chrysemys picta, Amer. Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 25(2), March 1941, pp. 402-412, 1 pl.

Diagnosis, measurements, illustrations; description of the stages; intermediate hosts, snails of the genus Helisoma; life history. Michigan. Bibliography of 11 titles.

Diseases and Parasites: Trematoda, Strigeidae

Olivier, Louis. Life history studies on two strigeid trematodes of the Douglas Lake region, Michigan, Journ. Parasitology (Rockefeller Institute, Princeton, N. J. $1.50 a copy), 26(6), Dec. 1940, pp. 447-477, 3 pls.

Species infesting tadpoles and domestic pigeons; 3-1/2-page bibliography.

Diseases and Parasites: Trypanosomiasis

Culbertson, James T. Trypanosomiasis in the Florida cotton rat, Sigmodon hispidus littoralis, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(1), Feb. 1941, pp. 45-52, 4 tables.

Trypanosoma sigmodoni n. sp., described from an apparently natural infection that was found in 18 of 90 Florida cotton rats. Artificial infections are readily accomplished. Recovered individuals are immune to reinfection. Reaction of the cotton rat to other trypanosomes is recorded.

Diseases and Parasites: Of crow

Morgan, B. B., and E. F. Waller. Some parasites of the eastern crow (Corvus brachyrhynchos brachyrhynchos Brehm), Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass. 75 cents a copy), 12(1), Jan. 1941, pp. 16-22.

Report based on autopsies of 112 crows from Wisconsin and Iowa; the number parasitized and the percentage of incidence of 15 groups of parasites are tabulated, and the findings further elaborated in text. There is a paragraph also on crow food. Bibliography of 32 titles.

Diseases and Parasites: Of game birds

Madsen, Holger. The occurrence of helminths and coccidia in partridges and pheasants in Denmark, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(1), Feb. 1941, pp. 29-34, 1 table.

More than 200 of each species were examined; the material and methods are described, and the results summarized, tabulated, and discussed. From author's summary: "In addition to coccidia, there were found an echinostome, cestodes, an acanthocephalan and nine species of nematodes. The echinostome, apparently Echinostoma revolutum, has not heretofore been reported from pheasants. The appearance of Dispharynx spiralis in partridges seems to be a new European host record. Capillaria columbae from partridges and C. collaris from pheasants are new host records for these parasites." Bibliography of 10 titles.

Diseases and Parasites: Of grouse

Morgan, B. B., and F. N. Hamerstrom, Jr. Notes on the endoparasites of Wisconsin pinnated and sharp-tailed grouse, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 194-198, 3 tables.

Authors' abstract: "One hundred and twenty-six sharp-tailed grouse (Pedioecetes phasianellus campestris) and 52 prairie chickens (Tympanuchus cupido americanus) were examined for endoparasites. Nematodes found in prairie chickens included Seurocyrnea colini (gizzard), Heterakis gallinae (ceca), Capillaria contorta (crop), Capillaria sp. (crop), and Ascaridia lineata (small intestine). Nematodes found in sharptails included the above mentioned parasites and in addition Cheilospirura spinosa (gizzard) and Subulura strongylina (ceca). Tapeworms recorded in this survey from prairie chickens and sharptails were Rhabdometra nullicollis and Choanotaenia infundibulum. Several species of coccidia were found in feces of both birds." Bibliography of 9 titles.

Diseases and Parasites: Of gull, herring

Aldous, Clarence M. Report on a wholesale die-off of young herring gulls, Hogback Island, Moosehead Lake, Maine, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass. 75 cents a copy), 12(1), Jan. 1941, pp. 30-32, 1 photo, 1 table.

Cause of the die-off unknown; 5 apparently ailing birds collected were rather heavily parasitized; the findings, by Dr. Clifford Nelson, are presented in the table; notes on earlier investigations as to parasites of the herring gull also are reported; the chief source of parasitism is probably the common rough fishes fed upon by the gulls.

Diseases and Parasites: Of muskrat

Takos, Michael J. A review of the literature on diseases and parasites of the muskrat, Maine Cooperative Wildlife Research Unit (University of Maine, Orono), 14 pp., table (mimeographed), Dec. 1940.

Summary of published records of diseases and tabulation of the occurrence of parasites with bibliography of 52 titles. From author's summary: "(1) From a survey of the literature, descriptions of muskrats suffering from leukemia, septicemia, lobar pneumonia, inflamed eyes, pyemia, 'haemolytic streptococcus', tuberculosis, coccidiosis, tularemia, and a skin ailment of fungous origin have been noted; (2) coccidiosis, tularemia, and abscesses leading to generalized pyemia are known to be fatal to muskrats in a wild state; (3) coccidiosis shows some possibility of human control; (4) parasites described from the muskrat include seven protozoa, twenty-eight trematodes, twelve cestodes, and nine nematodes. Two sucking lice, a flea, five parasitic mites, and a tick have also been found on the muskrat."

Diseases and Parasites: Of muskrat, ringworm

Charles, Vera K. A ringworm disease of muskrats transferable to man, Journ. Washington Acad. Sci. (W. J. Dichl, U. S. Bureau of Plant Industry, Washington, D. C. 50 cents a copy), 30(8), Aug. 1940, pp. 338-344.

Description of the dermatitis, symptoms, and treatment in man; occurrence and effects in muskrats; cultural characters and identification of the fungus as Trichophyton mentagrophytes. This parasite is known also from the gray squirrel. Bibliography of 8 titles.

Ecology: Census methods, woodland birds

Colquhoun, M. K. The density of woodland birds determined by the sample count method, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, London, N.W. 1, England. 20 shillings a copy), 9(1), May 1940, pp. 53-67, 3 tables.

Discussion of the value and utilization of counts as a basis for population estimates, in the light of field studies in England. Paragraphs from the author's summary: "(1) The distinction between a census and a count has not always been appreciated, and a more cautious use of the former term seems desirable; (2) in sampling woodlands the unit of time is preferred to that of space, together with a slow observing speed and a random rather than a fixed course; (4) a formula is given from which a coefficient of conspicuousness for each species can be obtained, and tentative coefficients are given for those species which bred within the area. When the coefficient is known the computing of populations from sample counts should prove possible." Bibliography of 13 titles, 10 of American papers.

Ecology: Effects of vole activities

Summerhayes, V. S. The effect of voles (Microtus agrestis) on vegetation, Journ. Ecology (Cambridge University Press, 200 Euston Road, London, N.W. 1, England. 25 shillings a copy), 29(1), Feb. 1941, pp. 14-48, 2 pls., 5 figs., 13 tables.

Studies in forest plantations by several years of observations upon exclosure and check plots. The following is quoted from the author's general conclusions: "The experiments carried out during the period 1932-8 have shown that voles exert a definite influence on the vegetation in the two areas studied. The general effect is apparently that of reducing the luxuriance of the dominant grasses so that other flowering plants and especially mosses are enabled to exist more abundantly among the dominants. On removal of the vole attack the non-dominants, particularly the mosses, decrease in abundance, apparently as a result of the increased competition with the more luxuriant dominants. Voles therefore tend to preserve a relatively open vegetation, comparatively rich in species. This is presumably effected by the direct eating or cutting up of the aerial parts of the dominants, and by the complicated series of burrows below the main surface of the vegetation, the formation and maintenance of these burrows preventing the development of large tussocks of grasses like Molinia or of thick matted turf-like growth as in Holcus mollis."

Ecology: Exclusion plots

Costello, David F., and George F. Turner. Vegetation changes following exclusion of livestock from grazed ranges, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 39(3), March 1941, pp. 310-315, 3 photos, 3 tables.

Although concerning livestock investigations, this paper is of value to wildlife manager in pointing out difficulties connected with studies by the exclusion plot method. The influence of rodents and other wildlife is the subject of one section of the discussion. Authors' conclusion: "Expected results from enclosures and protected areas are not always obtained. This is not the fault of the enclosure method. Lack of contrast between grazed and ungrazed areas deserves as much attention as outstanding differences between these areas. Interpretations of results from enclosures should always be accompanied by and based on detailed study of the factors which cause change in the vegetation."

Ecology: Fires

Sladdix, W. L. Forest fires and game, Southern Sportsman (Steck Bldg., Austin, Texas. 10 cents a copy), 5(8), March 1941, pp. 16, 34, 7 photos.

This article refers only to the destructive effects of fires and says nothing of controlled burning nor of the proofs of beneficial results of fires which have been adduced by S. W. Greene and Herbert L. Stoddard in numerous papers that have been abstracted in WILDLIFE REVIEW.

Ecology: Hedgerows

Patton, C. P. Farm hedges and their practical management with special reference to ditchbank vegetation, North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh, N. C.), 5(5), May 1941, pp. 8-10.

Discussion of the objections that are urged against hedges and statement of their values. "When the advantages of hedgerows across open fields are considered they far outweigh any disadvantages which could possibly be mentioned."

Ecology: Muskrat

Bellrose, Frank C., and Louis G. Brown. The effect of fluctuating water levels on the muskrat population of the Illinois River Valley, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 206-212, 12 tables.

Authors' abstract: "Based on house density, studies made along the Illinois River revealed a direct as well as an indirect effect of water level

on muskrat populations. Indirectly, muskrats were affected by the composition of the vegetation in the habitat. Vegetation communities were determined chiefly by seasonal changes of water levels. The waters of lakes were classed as stable, semistable, or fluctuating. Six times as many houses per unit area were recorded in lakes with stable, as in those with semistable, waters, and twice as many occurred in areas with semistable, as in areas with fluctuating, water levels. Cattail (Typha latifolia) communities supported more muskrat lodges per acre than any other plants. River bulrush (Scirpus fluviatilis), the most abundant marsh plant, was second to cattail in house density per acre. Marsh smartweed (Polygonum muhlenbergii) supported fewer houses per unit area than river bulrush, and wildrice (Zizania aquatica) contained fewer houses per acre than marsh smartweed. American lotus (Nelumbo lutea) beds formed 28.4% of the aquatic vegetation, but, in all but one lake, there were 50% fewer lodges per acre than in river bulrush or marsh smartweed communities."

Ecology: Populations, bird

Peterson, Roger T. How many birds are there?, Audubon Magazine (1006 Fifth Ave., New York, N. Y. 35 cents a copy), 43(2), March-April, 1941, pp. 179-187, 6 photos.

Discussing some of the basic data, the author guesses that, "eventually we will find not less than 5,000,000,000 breeding birds in the United States and probably closer to 6,000,000,000."

Ecology: Populations, vole

Leslie, P. H., and R. M. Ransom. The mortality, fertility, and rate of natural increase of the vole (Microtus agrestis) as observed in the laboratory, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, London, N.W. 1, England. 20 shillings a copy), 9(1), May 1940, pp. 27-52, 2 figs., 12 tables.

A technical paper of value to those interested in theoretical population dynamics. The word "natural" seems out of place in the title. Average age was around 34 weeks, the sex ratio was slightly inclined to the male side, the rate of increase amounted to about 90 per 1,000 per week, "which corresponds roughtly with a power of multiplying some ten times in six months." Bibliography of 14 titles.

Ecology: Succession

Lee, Wm. D. Native plant succession on piedmont soils, North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh, N. C.), 5(3), pp. 3-5, 14-15, 4 photos.

General description of plant successions with notes on accompanying changes in animal life.

Ecology: Succession on eroded land

Smith, Charles C. Biotic and physiographic succession on eroded farmland, Ecological Monographs (Duke University, Durham, N. C. $1.50 a copy), 10(3), July 1940, pp. 421-484, 1 fig., 33 tables.

Oklahoma, although one of the last States to be settled, has suffered as much soil erosion since agricultural occupation as some of the oldest farming districts of the United States. The author reviews literature bearing upon his study and gives a 3-1/2-page bibliography. He describes the region and methods of investigation and discusses successional phenomena in detail. Animals are given more attention than plants and there are sections on each of the orders of vertebrates represented. From the author's summary:

"In general, animals play a secondary role in soil succession. Excreta and remains of animals may be more important for their stimulating effect upon plant growth because of certain chemical substances present in the remains than for organic matter added to the soil. More or less mechanical loosening of soil is brought about by activities of animals."

"Rodents require both food and cover to be present in at least minimum quantities before they will occupy an habitat. If food is plentiful, an area may be occupied even though only a very smallamount of cover is available or if excellent cover is present and only a small food supply available an area will be occupied by certain species of rodents. The pioneer stages, with their large-seeded species of plants such as Helianthus, Ambrosia, Croton and Aplopappus ciliatus offer very attractive food to many rodents even though cover is very scanty. Midseral stages, with vegetation consisting largely of annual grasses such as species of Aristida, offer very little food attractive to most rodents and a type of cover that does not seem particularly attractive to these animals. The subclimax stage, with its scattering of perennial grasses and rather abundant legumes, offers good year-around cover and a plentiful food supply; thus we find this stage showing the largest population of rodents. Although somewhat less food is available in climax prairie, excellent cover is present and a large population of rodents is found. Insectivores were found only in subclimax and climax communities, apparently being limited to stages in succession where the soil is rich and where ground dwelling insects and earthworms are abundant.

"Meadowlarks were found to be most abundant in midseral stages. The following factors are to be considered in explaining this: (1) low population of rodents of these stages, (2) a large population of insects, especially grasshoppers, in these stages furnishes abundant food for these birds, (3) favorable nesting sites and nesting material. Other birds characteristic of the prairie were not found nesting in any of the seral stages."

Economics: Value of birds

Collinge, Walter E. Economic ornithology and the nation, North Western Naturalist (T. Buncle & Co., Ltd., Market Place, Arbroath, Scotland 2 shillings a copy), 15(4), Dec. 1940, pp. 216-218.

This author has repeatedly tried to arouse the British nation to the importance of supporting the study of economic ornithology, and now that he has passed the retirement age can scarcely be charged with having a selfish motive. The importance of the subject is succinctly stated. Fruit-growers and farmers cannot afford to neglect any agency that is conducive to better crops. Birds are a stupendous force for good and their study and fostering is a proper pressing function of the state. Agriculture is a branch of biology and it is only when its problems are attacked with a biological point of view that full success is likely to be attained. Especially at present is there acute need for encouragement of all natural aids to farming.

Education

Keller, J. O. The Edward K. Love Conservation Foundation. A year's progress in the encouragement of wildlife conservation (University of Missouri, Columbia), 20 pp., illus., April 1941.

Report of the Board of Governors of the Foundation on results obtained through awards of prizes and scholarships to 4-H Club members and Future Farmers of America.

Education: Coastal wildlife

McAtee, W. L. Wildlife of the Atlantic Coast salt marshes, U. S. Dept. of the Interior, Wildlife Circ. 11 (Supt. of Documents, Washington, D. C. 15 cents a copy), iv+32 pp., 7 pls., 10 figs., 1941.

"Salt marshes of the Atlantic coast have been formed under the opposed tendencies of sinking of the land and of its upbuilding by silt and sand. The plants that form the marshes occupy zones largely determined by the degree of inundation by tides. Eelgrass entirely submerged, smooth cordgrass regularly washed by the tide, and marsh hay covered only by exceptionally high water are characteristic plants. Each zone is the home or feeding area of certain kinds of wildlife. The appearance, distribution, and habits of the more common species are described, and general wildlife conservation is urged. This circular, which is intended for educational use, is a revision of Department of Agriculture Circular 520, issued in March 1939."

Education: 4-H clubs

Harrill, L. R., et al. The wildlife conservation program of the 4-H clubs in North Carolina, North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh, N. C.), 5(4), April 1941, 16 pp., illus.

The whole issue is devoted to 4-H club conservation work, and is contributed to by Ross O. Stevens and by several county agents. The clubs make surveys of the physical features, vegetation, and wildlife of farms. The program has brought closer understanding between fathers and sons, developed community cooperation, and improved hunter-farmer relationships. An outline of the work is given, the value of a wildlife camp as an incentive is made clear, and results for a number of counties are summarized.

Food Habits: Damage to corn by muskrats

Errington, Paul L. Muskrats in the corn, Farm Science Reporter (Ag Annex, Iowa State College, Ames), 1(4), Oct. 1940, pp. 14-16, 3 photos.

The loss is usually moderate, say 2 bushels to a field, and can in most cases be more than compensated for by sale of pelts of the animals.

Food Habits: Rabbit damage

Foster, W. S. Rabbits will eat your grass, Progressive Farmer (821 N. 19th St., Birmingham, Ala.), 56(2), Feb. 1941, p. 71, 2 photos.

A test made by the New Mexico State College indicates "that the removal of cattle and rabbits from a range x x x will allow it to be revegetated naturally, but that removal of cattle alone will not accomplish the desired results."

Food Habits: Utilization of broomsedge

Davison, Verne E., and William R. Van Dersal. Broomsedge as a food for wildlife, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 180-181, 1 pl.

Authors' abstract: "It has generally been assumed that broomsedge (Andropogon virginicus) is of relatively little use to wildlife as food. Records obtained by stomach examinations have borne out this assumption. Hundreds of small birds, principally song sparrows and juncos, were observed feeding on the seed of broomsedge--the only apparent food available above a 12-inch blanket of snow--January 23, 1940 along Highway 51 for about 100 miles south of Jackson, Mississippi. Repeated stops were made to verify the fact that broomsedge was being taken extensively and exclusively within less than 24 hours following the unusual weather condition for south Mississippi. Though the authors do not suggest the planting of broomsedge, the observation strengthens the belief that plants which supply emergency needs are occasionally as important as preferred foods in wildlife management."

Food Habits: Utilization of Russian thistle

Long, W. S. The utilization of Russian thistle by wildlife, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 136-138.

Author's abstract: "The exotic Russian thistle (Salsola pestifer), long considered a noxious weed, is found to be of value to some forms of wildlife in the arid and semi-arid portions of the west. Seven species of birds and ten species of rodents are noted as having utilized the plant, either for food or cover."

Food Habits: Of cat

McMurry, Frank B., and Charles C. Sperry. Food of feral house cats in Oklahoma, a progress report, Journ. Mammalogy (Wm. B. Davis, College Station, Texas. $1.00 a copy), 22(2), May 1941, pp. 185-190, 4 figs.

Report on 84 well-filled stomachs, discussed in 3 locality groups, and combined. Authors' summary: "Laboratory analyses x x x revealed 3 main foods, namely, insects, mammals, and garbage. Reptiles and birds were minor items. Insects contributed 17 and 25 per cent, respectively, to the food of cats collected on the Wichita Mountains Wildlife Refuge and in the residential section of the Fort Sill Military Reservation, but much less to the diet of cats from other sections. Mammals, chiefly rodents, composed from a half to four-fifths of the food of the cats in each habitat group except those collected in the residential section of Fort Sill where they made up only 10 per cent of the diet. Garbage formed two-thirds of the food of the cats collected in the residential areas on Fort Sill. In other environments it was from 10 to 16 per cent of the food. Lizards formed 4.5 per cent of the food of cats from the Wichita Mountains Wildlife Refuge, but they were not taken at all by the Fort Sill cats and comprised only 1.5 per cent of the food of the cats collected in other sections. Birds comprised 6.5 and 6 per cent, respectively, of the food of cats taken in the residential district of Fort Sill and of those obtained here and there along highways of the State. They occurred only once each in the two groups of cat stomachs representing the Wichita Mountains Wildlife Refuge and the nonresidential area of Fort Sill. In other words, cats of residential areas and those frequenting roadsides appear to be a greater menace to birds than cats hunting in open fields or woods. The data at hand, however, indicate that the prey of cats consists largely of the most abundant and available forms and do not justify the common belief that every roadside or field-roaming cat is in search of avian food."

Food Habits: Of coot

Jones, John C. Food habits of the American coot with notes on distribution, U. S. Dept. of the Interior, Wildlife Research Bul. 2 (Supt. of Documents, Washington, D. C. 25 cents a copy), iv+52 pp., 7 pls. (1 col.), 1 map, 6 tables, 1940.

As indicated in the title, distribution is given more attention than is usual in publications of this type; a map is reproduced that shows the breeding and winter ranges and the localities for extralimital records. The general habits are briefly, and the food habits fully, described. Based on calculations of the contents of nearly 800 stomachs, the food of the coot appears to be about 90 percent vegetable. The most important sources are the pondweed, sedge, and grass families and the algal order. The animal food, taken in all months, was chiefly insects. These items were much more prominent in the food of the young, totaling 46.6 percent. All of the food items are discussed and tabulated, and briefly summarized also by regions. Ingestion of gravel and shot receives special treatment and the economic status of the coot is reviewed. No trace of birds or their eggs was found in the

stomachs. Some damage is done to rice in California. Other depredations are sporadic, and the coot is regarded as normally an inoffensive bird. Bibliography of 27 titles.

Food Habits: Of cottontail

Dalke, Paul D., and Palmer R. Sime. Food habits of the eastern and New England cottontails, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 216-228, 2 figs., 9 tables.

Authors' abstract: "Food habits of the eastern cottontail (Sylvilagus floridanus mallurus) and the New England cottontail (Sylvilagus transitionalis) are treated together since all data indicate that the feeding habits of the two species are practically identical. Four methods were used in determining the feeding habits: (1) Direct observation of feeding animals, (2) inspection of feeding areas as evidenced by pellets, (3) examination of vegetation near tracks in the snow, and (4) analysis of stomach contents. Observations on cottontails during daylight hours showed two pronounced feeding periods: The first, three to four hours after sunrise; and the second, from sunset to one hour after. The feeding habits follow closely availability of plants as they develop from early spring to late fall. The diet during the winter months is largely bark, twigs, buds, and dried herbs. In spring the feeding habits change abruptly with the appearance of tender young shoots of herbaceous plants; herbs are largely used from that time through October. In captivity, rations of twigs, bark, and buds over a period of a month proved to be inadequate to maintain body weight. Of the 24 plants tested in these experiments, chestnut, basswood, serviceberry, yellow birch, sassafras, red maple, hawthorn, ironwood, elm, and red oak proved to be the most palatable. Analyses of the contents of 75 stomachs collected from April through October showed that grasses compose nearly half, and other herbaceous plants 31%, of the food. All herbs together formed 75% of the summer diet." Bibliography of 13 titles.

Food Habits: Of coyote

Murie, Adolph. Ecology of the coyote in the Yellowstone, U. S. Dept. of the Interior, Fauna of the National Parks, Bul. 4 (Supt. of Documents, Washington, D. C. 30 cents a copy), 206 pp., 57 figs., 1940 (1941).

This publication reports upon about two years of work on coyote relationships to the elk, mule deer, antelope, bighorn, and other mammals and birds of Yellowstone National Park. The fauna is not greatly different from that recorded in early days and the role of the coyote is about the same. The population of this predator has shown no tendency to rapid increase since cessation of control activities. Natural mortality is shown to be prevalent in all groups and this is efficacious in providing food in the way of moribund and dead animals for the coyotes and, applying to them as well, in holding down their numbers. Discussion of food habits makes up the bulk of this paper which finds the coyote no menace in the Yellowstone and recommends continuance

of the present policy of noninterference with predators. Bibliography of 24 titles.

Food Habits: Of crane, sandhill

Tanner, Dean. Autumn food habits of the sandhill crane, The Flicker (Mary Elwell, Duluth Teachers College, Duluth, Minn.), 13(2), May 1941, p. 21.

Analysis of droppings from Clay County, Minn., revealed corn, 94.4, sweetclover leaves 4.4, and flax flower stalks and pods 1.3, percent. Lesser items are mentioned and results of a Wisconsin study are quoted.

Food Habits: Of grouse, ruffed

Kuhn, Tracy M. November foods of the ruffed grouse in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 12(2), May 1941, pp. 10-11, 28, 3 photos, 7 tables.

Comparison of 1939 with the 1938 results (the latter noticed in WILDLIFE REVIEW, No. 26, Feb. 1940, p. 20). This report upon 207 crops includes a tabulation showing frequency of occurrence of the food items, and the volumes and parts taken. The leaders are buds and twigs of aspen, and fruits of Vitis. In the preceding year cherry and sheep sorrel headed the list. The results for the two seasons are combined in tabulations and compared with those published for the George Washington National Forest in Virginia.

Food Habits: Of hawk, Cooper's

McDowell, Robert D. The Cooper's hawk in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 12(1), April 1941, p. 4, 2 figs., 3 tables.

The number of specimens examined, 1937-1940, was 291. So far as permitted by the condition of the carcasses, data were recorded, and are tabulated, on sex and age groups, weights and principal measurements, and food items. The numerical system is employed in presenting the results as to food; mammals constituted 28.57, and birds 71.44, percent, respectively, of the captures. The consumption of three-fourths of the diet is considered as harmful to man's interests.

Food Habits: Of hawk, duck

Stager, Kenneth E. A group of bat-eating duck hawks, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 43(3), May-June, 1941, pp. 137-139.

The availability of easy prey in a great flight of free-tailed bats (Tadarida mexicana) from a cave in south-central Texas, attracts duck hawks that feed regularly upon the bats.

Food Habits: Of heron, great blue

Stiles, Bruce F. Nesting of the great blue heron in Pottawattamie County, Iowa Bird Life (Winthrop, Iowa. 25 cents a copy), 10(2), June 1940, pp. 20-22, 1 pl.

Brief general account of a nesting colony that was within a mile of a lake "in which game fish are stocked rather extensively." Examination of several pounds of fish remains from the ground under the nests revealed bones of only gar and carp.

Food Habits: Of raptors

Moon, Eugene L. Notes on hawk and owl pellet formation and identification, Trans. Kansas Acad. Sci. (Roger C. Smith, Sec'y., Manhattan, Kans.), 43, 1940, pp. 457-466, 2 tables.

Report on studies of pellets collected almost daily from resorts of the barn, great horned, long-eared, and short-eared, owls, and marsh hawk, giving notes on appearance, size, characteristics, and contents of the pellets. Bibliography of 25 titles.

Food Habits: Of seals

Dunbar, M. J. On the food of seals in the Canadian Eastern Arctic, Canadian Journ. Research (National Research Council, Ottawa, Canada. 50 cents a copy), 19(5), May 1941, Section D, pp. 150-155, 2 tables.

Review of literature (13 titles cited) on food of seals and report on examination of stomachs of: the ringed seal (Phoca hispida), 47, and harp seal (Phoca groenlandica), 1, both feeders on pelagic crustaceans; and bearded seal (Erignathus b. barbatus), 5, found to consume crustaceans, mollusks, and fishes. Scientific names of the food species are given.

Food Habits: Of snake, king

Petrides, George A. The coral king snake a predator upon the russet-backed thrush, Yosemite Nature Notes (Yosemite National Park, Calif.), 20(5), May 1941, p. 36.

Swallowing a nestling.

Food Habits: Of sparrow, chipping

Knowlton, G. F., and F. C. Harmiston. Insect food of the chipping sparrow, Journ. Economic Entomology (E. N. Cory, College Park, Md. 75 cents a copy), 34(1), Feb. 1941, pp. 123-124.

Names and numbers of insects identified from 41 gizzards collected in Utah, with brief references to the seeds found.

Food Habits: Of vulture, turkey

Scott, Thos. G. Feeding by turkey vultures at dens of the northern plains red fox, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 22(2), April 1941, pp. 211-212, 1 table.

Suggestive evidence that vultures take remains of prey from the vicinity of fox dens. The table compares food of red foxes and young vultures near Boone, Iowa, in summer.

Food Habits: Of vulture, turkey

Scott, Thos. G., and Robert Moorman. Turkey vultures in central Iowa, Iowa Bird Life (Winthrop, Iowa. 25 cents a copy), 10(3), Sept. 1940, pp. 34-37, 1 pl., 1 table.

Habits, care and growth of young, food. Fifteen samples of crop contents of young are tabulated and discussed and notes on the food of adults also are given.

Food Habits: Of woodpecker, pileated

Downing, Glenn R. The winter habits of the northern pileated woodpecker in Iowa, Iowa Bird Life (Winthrop, Iowa. 25 cents a copy), 10(3), Sept. 1940, pp. 43-46, 1 photo.

Account of general habits with specific notes on food. Analyses of droppings disclosed mainly remains of carpenter ants.

Introduction: Caribou

Cox, W. T. The fight for the woodland caribou, American Forests (919 Seventeenth St., N. W., Washington, D. C. 35 cents a copy), 47(2), Feb. 1941, pp. 55-57, 93-94, 4 photos.

Popular account of the depletion of this species, especially in Minnesota, and of its re-introduction. (Several papers relating to the subject have been abstracted in earlier issues of WILDLIFE REVIEW.) Some of the imported animals are reproducing.

Introduction: Elk

Kartchner, K. C. Elk introduction to Arizona, Arizona Wildlife and Sportsman (125 North Second Ave., Phoenix, Ariz. 15 cents a copy), 2(5), Aug. 1940, pp. 2, 11.

The native Merriam's elk was exterminated by 1898. Introduction of Rocky Mountain elk was begun in 1913 and continued for a decade or more. The methods used are described. By 1940 the animals numbered about 4,000. Hunting under permit is allowed but complaints of damage to crops are becoming more numerous.

Life Histories: Beaver

Seamans, Roger. The distribution of beaver in Vermont, Vermont Fish and Game Service (Montpelier), Bul. 3-1, Jan. 1941, 5 pp., 1 map, 2 tables (processed).

The contents, broader than indicated by the title, include a discussion of the decline of beavers in the State and of the results of restocking, and notes on the present numbers of the animals, colony characteristics, food, and economic status. The map shows the distribution of beaver colonies in October 1940.

Life Histories: Boar, Wild

Bruce, Jay. More about the habits of the wild boar, California Conservationist (State Dept. of Natural Resources, Sacramento. 15 cents a copy), 6(5), May 1941, pp. 14, 21, 2 photos.

Information on the colony in Monterey County, Calif. Food much the same as that of free-ranging domesticated swine, largely acorns. The wild pigs feed mainly at night. Although kept in check apparently by coyotes and mountain lions, the wild boars have increased their range. Predator control is urged but it would seem that the desirability of encouraging this introduced beast should first be made clear.

Life Histories: Crayfish

Tack, Peter I. The life history and ecology of the crayfish Cambarus immunis Hagen, Amer. Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 25(2), March 1941, pp. 420-446, 2 pls., 2 figs., 5 tables.

Taxonomic status, habitat, activity, burrows and chimneys, mating, oviposition, incubation, stages, growth, mortality, propagation, food, natural enemies. New York. Two-page bibliography.

Life Histories: Deer, White-tailed

Seamans, Roger. Deer weights and measurements, Vermont Fish and Game Service (Montpelier), Bul. 3-2, February 1941, 16 pp., 3 figs. (1 map), tables (processed).

"The annual legal kill of deer in Vermont has steadily increased since the first [modern] open season of 1897." That in 1940 was 3,403 legal bucks. "It was made up of a normal distribution of all ages and the marked increase does not appear to be due to a larger fawn crop for any one year." Weights (90-150 lbs.) and measurements are tabulated and summarized. Report is made on abnormalities found in 22 specimens. In general, however, the animals were in fine condition.

Life Histories: Ducks, Scaup

Munro, J. A. Studies of waterfowl in British Columbia. Greater scaup duck, lesser scaup duck, Canadian Journ. Research (National Research Council of Canada, Ottawa. 50 cents a copy), D, 19, pp. 113-138, 4 pls., 3 tables, 1941.

Distribution, food habits, and behavior receive most consideration; there is a bibliography of 17 titles. Author's abstract: "Nyroca marila is an abundant migrant through British Columbia and large numbers winter in the coast region. The sex ratio in winter flocks is predominantly male. Chara was the chief food eaten by 57 specimens from Okanagan Lake, miscellaneous vegetable matter was second, and molluscs third in importance. Food items, listed in order of importance, on coast streams and lakes were: vegetable matter, molluscs, salmon eggs, salmon flesh, and, on salt water: gastropods, sea lettuce (Ulva sp.), crustaceans, and herring eggs. N. affinis nests commonly in parts of the dry interior and elsewhere in the province is a migrant and scarce winter visitant. Sex ratio is predominantly male. Courtship continues through April and May; laying commences in June and late clutches are found in August. Females defend their young vigorously and a habit of combining broods has a probable survival value. Males raft on certain lakes in July and go into eclipse as flight feathers are shed. These populations include yearling and post-breeding females and later, adolescents. The former moult at this time. Adults migrate early and those remaining are largely young of the year. Amphipods are the chief food of all age groups on the nesting ground; aquatic insects and seeds of aquatic plants are also important. Both species of scaup ducks are economically important as food and for sport in the interior but less so on the coast where, because of a different diet, their flesh is less palatable. It was not determined whether the consumption of salmon eggs and herring eggs is of economic significance. Elsewhere than on the coast scaup ducks are related to other interests only to the limited extent to which they are food competitors of trout and other commercially valuable fishes."

Life Histories: Gila monster

Jackson, Earl. As tough as they come, National Park Service, Region 3 (Santa Fe, N. Mex.) Quarterly, 3(2), April 1941, pp. 3-9, 1 photo (frontispiece) (processed).

Distribution of the two known species of the genus Heloderma; description and notes on the life history of the Usonian form, including oviposition and food habits. The biting propensities and venomous qualities are discussed; the Heloderma is not afraid of a rattlesnake and in an enclosure vanquishes the snake; the "monster's" hide is too tough for the fangs of the rattler to penetrate.

Life Histories: Grouse

Krefting, L. W. The grouse of Minnesota, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(9), June 1941, pp. 24-29, 1 pl.

Notes on distribution, numbers, appearance, local names, and food habits of 5 species.

Life Histories: Grouse, Ruffed

Tanner, Dean. A submarginal population of ruffed grouse, The Flicker (Museum of Natural History, University of Minnesota, Minneapolis), 13(1), March 1941, pp. 7-9.

Description of scantily-occupied habitats and of the habits of the birds therein, particularly as to drumming and feeding. Identifications of numerous food items from droppings are recorded.

Life Histories: Kangaroo rat, Tulare

Tappe, Donald T. Natural history of the Tulare kangaroo rat, Journ. Mammalogy (Wm. B. Davis, College Station, Texas. $1.00 a copy), 22(2), May 1941, pp. 117-148, 2 pls., 4 figs., 4 tables.

Dipodomys heermanni tularensis. After outlining the range of the subspecies (map) and describing methods of the study, the author presents his findings under the heads of burrow systems, food and storage, economic importance, water requirements, activities, sanitation, voice and communication, senses, locomotion, methods of escape from enemies, breeding, growth, development, and behavior of young, population movements, animal relationships, and length of life. The food consists chiefly of seeds, especially those of grasses, but includes some green grass and other plants. Bibliography of 21 titles.

Life Histories: Muskrat

Grimm, Wm. C. The muskrat in northwestern Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 12(2), May 1941, pp. 6-7, 2 photos, 2 tables.

Foods discussed and tabulated (cattails and sedges are favorites); feeding habits described; sex ratio (58:41); age composition (four-fifths of the fall population young); average length (22 inches); weight (2.37 lbs.); notes on number of litters and characteristics of young; the possibility of a cycle in numbers is considered.

Life Histories: Partridge, Hungarian

Carlson, C. Edward. The Hungarian partridge in Minnesota, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(7), April 1941, pp. 41-44.

Summary of introductions in N. A. and their success. The first birds in Minnesota came by natural spread from Iowa. Despite extensive plantings, the species has not become established outside of the region of intensive corn and small grain production. There, however, it thrives. Life history notes based on original observations.

Life Histories: Pheasant nesting success

Baskett, Thomas S. Production of pheasants in north-central Iowa in 1939, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 168-174, 4 tables.

Author's abstract: "On a plot of 1,520 acres in north-central Iowa, 72 pheasant nests were found by repeated systematic searches. Density of nests was high in fencerows and road ditches, but percentage of success, low. In small grain, density was low, but success, high. Predation by several species caused losses of 40% of the 45 unsuccessful nests. The mean clutch size was 10.4 and mean brood size for older broods, 6. An estimated 90 young were produced by 50 adult pheasants per sq. mile." Bibliography of 11 titles.

Life Histories: Pocket gopher

Scheffer, Theo. H. Excavation of a runway of the pocket gopher (Geomys bursarius), Trans. Kans. Acad. Sci. (Roger C. Smith, Sec'y., Manhattan), 43, 1940, pp. 473-478, 3 figs.

Isolated tunnelling by a single female described and illustrated. It measured 510 feet in the aggregate and was accompanied by 105 mounds.

Life Histories: Prairie dog

Clapp, Kennedy N. Prairie dogs, National Park Service, Region 3 (Santa Fe, N. Mex.), Quarterly, 3(2), April 1941, pp. 21-25, 1 fig. (processed).

Original habitat; present range; reduction was inevitable but the author favors restricted preservation as in parks. Burrows, and the feeding and other habits are described. Rattlesnakes and burrowing owls are in no sense commensals, they are deadly enemies of the prairie dog and the reverse also is true.

Life Histories: Sex ratio, mourning dove

Pearson, Allen M., and George C. Moore. Dove sex ratio found almost evenly divided, Alabama Conservation (Alabama Dept. of Conservation, Montgomery), 1(7), May 1941, p. 8.

Tabulation of sex determinations of 3,491 doves by months; the average is 51.82 percent males.

Life Histories: Sex ratio, pheasant

Buss, Irven O. Sex ratio of Wisconsin pheasants, Wisconsin Conservation Bulletin (Wisconsin Conservation Department, Madison), 6(5), May 1941, pp. 4-6, 2 tables.

Observed ratios may differ from those presumably nearer the actual as determined from trapped birds; an illustration is given showing the following discrepancy: Observed 1 to 12.2; trapped, 1 to 4.2. The tabulations relating to more than 75,000 birds are of observed sex ratios. The average for all counties is 1:4.5. Contrasting the records for a group of northern (and less hunted), and an equal number of southern (hence more hunted), counties, the ratios of 1:2.7 and 1:5.5, respectively, are obtained.

Life Histories: Wren, Bewick's

Miller, Edwin V. Behavior of the Bewick wren, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 43(2), March-April 1941, pp. 81-99, figs. 25-27.

Summary of observations on several subspecies under the headings of: Animal relations, foraging, roosts, preening, songs and call notes, territory, nests, mating and nest-building activities, behavior during the laying period, and incubation. There is a summary and a bibliography of 28 titles.

Management: Attracting birds

Baker, John H. (Editor). The Audubon guide to attracting birds (Doubleday, Doran, and Co., Garden City, N. Y. $2.50 a copy), xviii+268 pp., 9 pls. (1 col.), 11 figs., tables, 1941.

Seven of the total of 12 chapters are by Roger T. Peterson; two of them relate to bird observation and photography and banding, and the others to attracting by planting, feeding, providing nest boxes and water, and creating watered areas. Richard H. Pough contributes two chapters on, "Our attitude toward predators," and on "Trespass and your rights." Dorothy A. Treat has a section on bird attraction as "An educational community project," and the editor two on "Maintenance of sanctuaries," and "How you can help protect our wildlife." There are appendixes listing plants attractive to birds in the northeastern States and giving useful references corresponding to the chapters. The various authors know their stuff and the result is a satisfactory manual.

Management: Beaver

Bradt, G. W. Beaver management pays, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 10(5), April 1941, pp. 4, 5, 2 photos.

A closed season, beginning in 1920, restored beavers to the point where they were the cause of numerous reports of damage. Open seasons were, therefore, resumed in 1936 but at the same time a system of closed areas was established. The plan seems to be working well as the take of beaver and the population have been well maintained and complaints are much less numerous. Relations of beavers to trout, muskrats, and waterfowl are briefly discussed. Receipts from sales of pelts yield trappers about $150,000 annually.

Management: Burning

Terry, Elwood I. The future of forestry and grazing in the southern pine belt, Scientific Monthly (Lancaster, Pa., 50 cents a copy), 52(3), March 1941, pp. 245-256, 18 photos.

Those wishing to consult all of the important literature on burning in the Southeast should not miss this article. On the whole, it does justice to the contributions of S. W. Greene, several of which have been noticed in WILDLIFE REVIEW. The difference in point of view is graphically shown, however, by the addition of a single word to the title of one of Greene's articles, thus: "The forest that fire made" poor. Greene thinks of the relation of the longleaf pine forest to grazing, and Stoddard of its capacity for quail production, but the present author writes of it purely as a forest. He thinks that the other uses should be separated and that lands devoted primarily to timber production should be so managed as to yield the maximum. "There is plenty of land on which to develop both the South's magnificent forest resources and a splendid live-stock industry without mixing the two on the same areas to their mutual detriment." He would probably say the same with respect to game (quail are mentioned on p. 246) but this attitude should serve to temper foresters' claims about game producing values of the forest. Certainly their ideal, the uniform and closely stocked plantation, is a single-crop proposition, and its interior as nearly a "biological desert" as any vegetated area can well be.

Management: Controlled hunting

Burroughs, R. D., and Laurence Dayton. Hunting records for the Prairie Farm, Saginaw County, Michigan, 1937-1939, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 159-167, 2 figs., 5 tables.

Author's abstract: "The Michigan Department of Conservation has cooperated with the Farm Security Administration since 1937 in the management of a controlled hunting program on 8,400 acres of isolated farm and wasteland. Accurate records of hunting pressure and the annual kill of ring-neck pheasants (Phasianus colchicus torquatus) and cottontail rabbits (Sylvilagus floridanus mearnsii) have been obtained. The data are presented in 5 tables and are analytically treated. Hunting pressure increased from 8,168 man-hours in 1937 to 14,068 in 1938 and to 21,481 in 1939. In 1938 the pheasant kill jumped from 616 to 1,244 male birds; the kill in 1939 (1,318 male birds) showed only a 6% increase over that of 1938 in spite of a 34% increase in hunting pressure. This suggests that the kill per unit-area depends on the shootable population rather than on the hunting pressure. The fact that the kill per sq. mile remained almost constant (94 and 101) during 1938 and 1939 seems to indicate that we cannot expect this area to yield a much greater annual harvest of male pheasants without a definite improvement in the habitat. Approximately 66% of the pheasant kill has consistently been made during the first week of the hunting season, and 80% by the end of the second Sunday. Extending the open season from 15 days to 22 days in 1939 had but little effect on the seasonal kill; only 7% of the birds killed in 1939 were taken during the extra 5 days. The high kill of cock pheasants per unit-area does not appear to have had an adverse effect on normal mating and reproduction of this species."

Management: Farm game

Chalk, John D. The North Carolina cooperative farm game program, Pittman-Robertson Quarterly (U. S. Fish and Wildlife Service, Washington, D. C.), 1(1), Jan. 1941 (June), pp. 15-20 (processed).

Employment of a staff of biologists, establishment of a periodical to carry wildlife management information and news, and presentation to farmers of a simple program. "In regard to the harvesting of the wildlife the landowners have a chance to choose one of the plans following: (1) Sanctuary--for 5 years; (2) temporary sanctuary, and (3) regulated hunting." "While the purposes back of the temporary sanctuary idea are sound, we have found that we can accomplish the same thing under the regulated hunting plan and perhaps with more satisfaction." "At the present time there are 742 regulated hunting cooperators, with a total of 300,124 acres; 74 five-year sanctuary cooperators, with a total of 22,751 acres; and 62 temporary sanctuary cooperators, with a total of 26,335 acres." The field biologists advise farmers on management procedures. Cooperative agreements are signed under which "The Department agrees to furnish signs for posting the property and the landowner agrees to assist actively in game law enforcement." Details are given of the extent to which management practices have been adopted; these have been put into effect not only on the farms of signed cooperators, but by imitation on those of neighbors. The effects upon hunting are discussed, and while restrictive, they have not resulted in complaint. Sportsmen's organizations approve the work which has purposely been kept within modest limits, and not propagandized. Research is being carried on looking toward improvement of the program.

Management: Farm wildlife

Edminster, Frank C. Wildlife management through soil conservation on farms in the northeast, U. S. Dept. of Agriculture, Farmers' Bul. 1868 (Supt. of Documents, Washington, D. C. 10 cents a copy), 52 pp., 25 figs. (plus 2 cover illustrations), 3 tables, 1941.

Epitome: "Wildlife is a product of the land; hence, it is obvious that patterns of land use developed in pursuit of agriculture will in a large measure determine the abundance or scarcity of wildlife. The increasing destruction of soil by erosion and, in good part, the decreasing populations of farm wildlife have both resulted from misuse of land. The great need for reversing this process of waste has long been apparent. Some of the possible ways of checking erosion and increasing wildlife in the 12 Northeastern States are considered here. The principles and some of the practices apply to an area embracing the whole northeastern quarter of the country. Soil conservation as well as the conservation of wildlife depends fundamentally on the establishment and maintenance of vegetation. Soil will erode unless it is protected from rain and wind. Wildlife disappears unless there is a place for it to live. How wildlife habitats may be developed with vegetation used to protect the soil is told in this bulletin."

After certain general discussion of wildlife values and management, the author takes up the development of habitat through protection from fire and

grazing, treatment of cultivated lands, use of field hedges and windbreaks, planting of field borders, gullies, and stream-banks, and management of woodland and water areas. Lists are given of plants for use in each situation. Special practices beneficial to wildlife are discussed with respect to feed patches, winter feeding, and game refuges. For each of the principal plants recommended for environmental improvement, there is a brief paragraph embracing a terse description and statement of wildlife utilization and habitat preferences. An excellent bulletin.

Management: Farmer-sportsman relationship

Kircher, Wm. H. Hunting is not a nuisance, The Farmer (55-57 East 10th St., St. Paul, Minn.), 59(9), May 3, 1941, pp. 5, 12, illus.

Rather confused with an account of game research in Iowa, is that of the organization and experience of a club of 12 farmers who posted their land against hunting without permission, charged hunters a dollar a day for hunting over their combined properties, and had each hunting party accompanied by a club member. The last provision is apparently what made the scheme work.

Management: Forest game

Schilling, E. A. Wildlife management, Florida Game and Fish (Commission of Game and Fresh Water Fish, Tallahassee), 2(5), May 1941, pp. 12-14.

Statement as to refuges on national forests which have proved successful in maintaining game populations within their boundaries but not in restocking surrounding areas. Disadvantages of the refuges are analyzed and statement is made as to the measures taken to get better results from wildlife management areas. Eight such tracts totaling some two million acres are now established in the national forests of the Southeastern States. They have been under administration from 3 to 5 years; some of the results are cited; the outlook appears favorable.

Management: Harvesting, deer

Sanders, Earl. A preliminary report on the study of white-tailed deer in the Edwards Plateau of Texas, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 182-190, 9 tables.

Author's abstract: "A report of a study of dressed weights and antler point records of 825 buck deer examined during the 1938 hunting season in Gillespie, Kerr, Llano, and Mason counties in the Edwards Plateau of Texas. The deer were grouped in weight and antler point classes for the county in which taken. Body and antler measurements were made on 170 of them. Adequacy of county samples was tested against weights of 83 other deer, total kill on one ranch in Mason County. Records from 431 shooting preserves show 5,617 deer killed on 964,097 acres in these counties. The deer population density, hunting pressure, grazing pressure of domestic stock, and competition of deer and livestock for forage are discussed. The average dressed weight of the

825 deer was 73.77 lbs. and varied between counties from a low of 68.99 lbs. to a high of 79.56 lbs. The county that had the highest average dressed weight also had the largest number of acres per deer killed, and as the number of acres per deer killed decreased, the average dressed weight also decreased. A partial analysis was made of data for 86 ranches containing 200,700 acres on which 2,517 deer were killed; an average of one buck on each 79 acres."

Management: Inventory, game in eastern Tennessee

Wing, Leonard. A game survey in northeastern Tennessee, Journ. Tenn. Acad. Sci. (Kendall Born, Division of Geology, Nashville, Tenn. 50 cents a copy), 15(3), July 1940, pp. 309-320.

The author discusses the history of settlement of the area and the characteristics of the people as bearing upon wildlife. Reduction in game and the factors responsible for it are systematically treated. Ecological succession, the existing game species, and the future of the area are other topics considered. "East Tennessee is a region of considerable game potentialities but of few game realities. The realization of its fullest possibilities depends upon the changes in human outlook necessary to control detrimental activities, if not to eliminate them, and to assist in the upbuilding of the natural endowments. Properly handled and stimulated, the region can become one of the country's outstanding game areas. x x x Game management cannot be segregated from the social and economic status of the people of the area. The job is only started when a new feeder is installed. Game and land form two corners of a triangle, and the people form the third. This is especially true in the East Tennessee hills where the people are impoverished, their contact with the world restricted, their agriculture outmoded, and their educational facilities inadequate. x x x Successful game management in this region is linked with the improvement in the economic well-being of the people. Improvement in the economic conditions will bring social improvement and a more wholesome attitude toward the land and the attributes of the land. It is probable that the soils in the mountain areas will never be able to support adequately more than a fraction of the existing population. Game, forest products, and handicraft industries offer the best future for the area."

Management: Inventory, red fox

Scott, Thos. G. A method for estimating the red fox population, Iowa State College (Ames) Journ. Science, 15(2), Jan. 1941, pp. 155-159.

Description of the various kinds of evidence of the presence of foxes; occurrence on sections is determined by inspection for sign; a 5 percent sample appears adequate; occurrence is calculated as a frequency index of sections occupied and that multiplied by 1.6 (average maximum number of foxes per section) to obtain a population estimate.

Management: Inventory, turkey

Mosby, Henry S. The wild turkey in Virginia, Pittman-Robertson Quarterly (U. S. Fish and Wildlife Service, Washington, D. C.), 1(1), Jan. 1941 (June), pp. 1-13, 3 figs., 2 tables (processed).

Reference to available literature on the wild turkey of which 9 titles are cited. A map of the original, and the present, distribution of the species is presented and the estimate made that the bird now occupies only 28 percent of its former range. The bulk of the paper is devoted to presentation of the technique and results of an inventory of the turkey in Virginia. In 1937, it is believed that there were about 2,100 flocks totaling approximately 25,000 individuals.

Management: Muskrat

Highby, Paul R. Managing our muskrat resource, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(7), April 1941, pp. 17-20.

Chiefly compiled account of the life history and of management suggestions.

Management: Otter

Anon. Michigan otter still a puzzle, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 10(5), April 1941, p. 5, 1 map.

An open season, concurrent with that on beavers, yielded only 266 otter pelts which brought from 8 to 12 dollars each. The plan is to be tried another year to learn whether otter trapping is of material value to the citizens and whether the otter population justifies cropping. Study of the food of 229 individuals revealed in their stomachs, one-quarter game and pan fishes, one-half forage fishes, and the remainder largely crayfishes, frogs, and insects.

Management: Planting

McAtee, W. L. Plants useful in upland wildlife management, U. S. Dept. of the Interior Conservation Bul. 7 (Supt. of Documents, Washington, D. C. 10 cents a copy), 50 pp., 5 plates, tables.

General discussion of the use of plants in wildlife management as cover makers and food producers and of management practices. The bulk of the bulletin is made up of lists of perennial plants valuable in furnishing cover, browse, herbage, mast, fruit, and seed in 10 regions of the United States. There is also a similarly classified list of plants that are adaptable throughout the country as a whole. Varieties of crop plants suitable for use in food patches are listed for every State and there is a discussion of the value to wildlife of plants often classed as weeds. In some way, not now clear, the subheading on page 8 was altered to an erroneous form. It should read, "Plants suitable for definite regions." On this same page the figure 10 in first line of second paragraph should be 11, and the initial in Dalke's name in footnote should be D.

Management: Planting for wildlife and erosion control

Johnson, J. A. Planting Lespedeza sericea with black locust, Soil Conservation (Supt. of Documents, Washington, D. C. 10 cents a copy), 6(12), June 1941, pp. 331-332, 334, 1 photo.

In Mississippi. Author's conclusions: "(1) L. sericea with locust improves the erosion-control value of the planting because a close ground cover is more quickly obtained. This is particularly true in winter when the heavier leaf mulch of L. sericea is needed to supplement the very light locust mulch; (2) locust does not suffer in growth as a result of competition from L. sericea. In fact, the opposite appears to be true. At New Albany where the areas were closely evaluated, locust plantings containing L. sericea are as good or better than those without it; (3) L. sericea is maintaining itself in 3- to 5-year stands of locust with a vigor indicative of a long existence, possibly even to the point of permanency; (4) as to whether or not the areas actually offer an improved wildlife habitat, it is apparent that a careful census of treated and untreated areas will be necessary before an authoritative statement can be made. The observations indicate, however, that the black locust-L. sericea areas are useful to rabbits, quail, and small birds. It was reported that quail made good use of the areas in the Laurel project during the nesting season."

Management: Quail food and cover

Lehmann, Valgene W., and Herbert Yard. Some plants valuable to quail in southwestern Texas, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 131-135, 1 fig., 2 tables.

Authors' abstract: "In southwestern Texas preferred habitat of the bob-white (Colinus virginianus) is sandy grassland with scattered brush, and farms not closely cultivated. Chestnut-bellied scaled quail (Callipepla squamata castanogastris) reach maximum numbers on tasajillo-pricklypear flats. Most important winter foods of bob-white in the Southwest are provided by Panicum texanum, Sorghum, and Croton capitatus, C. punctatus, and C. texensis, while Adelia angustifolia, Acacia roemeriana, and Lupinus subcarnosus are prominent food producers for the blue quail. A primary requisite of bob-white range is woody cover, principally for loafing in midday. Clumps 3 to 10 yards in diameter that provide concealment, freedom of movement underneath, and good visibility, are ideal. Distribution of woody cover approaches the optimum for bob-whites when clumps are located 100 to 200 yards apart. Cactus cover may be essential for heavy populations of chestnut-bellied scaled quail; when pricklypear is burned for cattle feed, therefore, clumps approximately 1 acre in size and 100 yards apart should be spared where quail are desired."

Management: Raccoon

Preble, Norman A. Raccoon management in central Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release No. 161, 9 pp., 1 fig. (mimeographed), April 1941.

Summary of the investigation upon which this leaflet is based, as to the abundance of raccoons and factors affecting it, color and measurements of the animals, sex ratio, annual kill, other mortality, den trees, food (60 percent corn), and economic status. Management suggestions are given in 17 brief paragraphs. Bibliography of 17 titles.

Management: Refuges

Plattes, Cyril. Refuge leader of the nation, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(7), April 1941, pp. 55-58.

The State has 188 refuge areas, totaling 3,335,505 acres and prohibits the shooting of waterfowl upon open water--a provision applying to an additional 3,000,000 acres. Minnesota has the largest single State sanctuary, 1,290,000 acres in the Superior National Forest. However, small refuges are more desirable and they should be carefully distributed. Present management is described and recommendations made as to the future. Seven State-owned combined refuge and public shooting areas are listed. "Development of Minnesota game refuges is progressing to the financial limit. Foremost in the minds of administrative officials is the basic function of a refuge: To produce an outflow of game to surrounding ranges. They are mindful that this outflow can only arise from population pressure within a refuge, and must necessarily vary with the mobility of the species to be given most protection. Therefore, they are viewing Minnesota's refuge program critically with a view of obtaining improved refuge patterns and better conditions for wildlife all around."

Management: Seal, Fur

Bower, Ward T. Alaska fishery and fur-seal industries in 1939, U. S. Dept. of the Interior, Bur. Fisheries, Administrative Report 40 (Supt. of Documents, Washington, D.C. 15 cents a copy), pp. 159-184, 2 pls., tables, 1941.

Contains a report on the composition of the Pribilof fur-seal herds by Harry J. Christoffers (his last as he died in 1939), and information on the harvest of skins, and manufacture of the by-products, meal and oil. The production and utilization of foxes and reindeer on the Islands also are reported.

Management: Small game, Oregon

Einarsen, Arthur S. Suggestions on management of small game in Oregon, Oregon Agr. Expt. Sta. (Corvallis), Circ. 140, 18 pp., 3 figs., Jan. 1941.

This publication is based on the findings of the Cooperative Wildlife Research Unit. It reviews conservation activities and hunter practices in Oregon, and points out how greater public participation can aid the State game department in maintaining shootable small game. Suggestions are given for the selection and care of game-management areas with special reference to the

cruising tendencies of the species for which they are intended: ring-necked pheasant, bob-white, and valley quail, in particular. Mention is made also of blue and ruffed grouse and of the Hungarian partridge. Sections of the circular are devoted to aiding game in winter, controlling predators, protecting game, increasing water facilities, improving waterfowl food supply, and managing duck ponds and marshes.

Management: Transplanting valley quail

Einarsen, Arthur S. Contributions to the management of California valley quail, Murrelet (105 Anderson Hall, University of Washington, Seattle. 50 cents a copy), 22(1), Jan.-April 1941, pp. 8-11, 2 figs., 1 table.

These quail are so sedentary that their increase builds up large local concentrations, as many as 800-1000 birds in a band. Obviously a good management measure is trapping and transplanting. This proved easy and effective (methods described and results tabulated) and is recommended for further trial, due care being taken to select suitable environment for the releases.

Management: Turkey

Blakey, Harold L. A vanishing American, Florida Game and Fish (Commission of Game and Fresh Water Fish, Tallahassee, Fla.), 2(5), May 1941, pp. 3-5, 11, 2 photos.

Account of drastic reduction in the range and the numbers of the wild turkey, with special reference to developments now threatening the species in South Carolina. Account of measures that have been taken to improve Bull's Island, Cape Romain Refuge, for turkeys and suggestions for management elsewhere.

Natural History: Birds of Kansas

Long, W. S. Check-List of Kansas birds, Trans. Kans. Acad. Sci. (Roger C. Smith, Sec'y., Manhattan), 43, 1940, pp. 433-456.

Briefly annotated list of 427 species and subspecies.

Natural History: Reptiles of Washington

Owen, Robert P. A list of the reptiles of Washington, Copeia (M. Graham Netting, Carnegie Museum, Pittsburgh, Pa. 75 cents a copy), 1940(3), November, pp. 169-172.

Annotated list of 24 species and subspecies. Bibliography of 7 titles.

Natural History: Turtles of Minnesota

Breckenridge, W. J. Minnesota turtles, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(7), April 1941, pp. 11-16, 6 figs.

Illustrated key to 8 species; notes on their food habits and other life history.

Natural History: Vertebrate

Anon. American wild life (compiled by the Writers' Program of the Work Projects Administration in the City of New York) (Wise & Co., Inc., New York, N. Y. $4.50 a copy), xiv+749 pp., 6 col. pls., 327 photos, 1940.

A compilation of the popular natural history type that has benefitted by the contribution of much illustrative material and by the technical advice of numerous authorities. Brief accounts, well balanced as to description, natural history, and news interest, are given for representative species of the vertebrates of North America. The illustrations, of much diversity as to type and source, are adequate. The ample index is a guide to text and illustrations, and to pronunciation of animal names.

Propagation: Bob-white

Brill, Charles J. Down comes the cost of quail production, Southern Sportsman (Stock Bldg., Austin, Texas. 10 cents a copy), 5(9), April 1941, pp. 9, 19, 3 phptos.

Account of experience in Oklahoma in the improvement by selection of egg production and adult quality, while at the same time the cost of production was brought down to 70 cents per bird. This breeder believes that the figure can be reduced still further, probably to 50 cents.

Propagation: Hatchability and temperature

English, P. F. Hatchability of pheasant eggs in relation to some known temperatures, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 213-215, 5 tables.

Author's abstract: "During the course of a study entitled 'Causes of mortality of ring-necked pheasants in Michigan,' 500 pheasant eggs were divided into 16 lots and subjected to the following temperatures preparatory to hatching: 10, 16, 31, 68, and 85° F., and storage temperature (at which a check lot of 50 eggs was held). There were 3 lots of 30 eggs in each temperature class. One lot in each class was exposed once; another, twice; and the third, three times. The eggs were marked, mixed, and set at the game farm. Hatching results were observed. No appreciable difference in the hatch of any group was noted. Apparently temperature is seldom a cause of hatching failure."

Research: Cover values

Baker, Maurice F. Age classes of winter cover used by the eastern bob-white, Colinus v. virginianus, in southern Iowa, Iowa State College (Ames) Journ. Sci., 15(1), Oct. 1940, pp. 3-11, 1 pl.

A two-year study of winter survival of quail in coverts that were classed according to the ages of trees in them. Part of author's summary: "From the data obtained it appeared that any age class of covert might be adequate for quail in winter if other factors are favorable, but that those coverts above the 24-28 year age class have a definitely greater use for quail. Over the two year period 75 per cent of the vacant coverts occurred in coverts below the average age class. The average number of quail in the younger group was 11.2 and the older group 14.8."

It would seem more to the point if the study had dealt with the age of the ground cover, or at least with correlation of its stage of succession with that of the trees. Bibliography of 6 titles.

Research: Irradiation

Wolfson, Albert. Light versus activity in the regulation of the sexual cycles of birds: The role of the hypothalamus, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 43(3), May-June 1941, pp. 125-136.

Those who wish to follow this subject, which has been treated in WILDLIFE REVIEW chiefly in relation to pen propagation, will find in this article a discussion of the essential literature (20 titles cited) on the role of light versus activity in advancing the sexual cycle. Part of author's conclusions: "It does not seem probable that daylight increasing 2 to 3 minutes a day under natural conditions penetrates the tissues of the head to stimulate the hypothalamus and pituitary. Light is an important factor in the regulation of the sexual cycle, but only in so far as it provides a stimulus for wakefulness. Since the wakefulness is under the control of the hypothalamus, the hypothalamus becomes the important timing center for the sexual cycle. x x x The hypothalamus, on the basis of recent work, seems to be that part of the nervous system which regulates the time of breeding and of migration. It is the integrator of the impulses concerned with the sexual cycle such as auditory, visual, tactile, and proprioceptive. In some species several of these impulses are important, while in others only one may be important. It has been shown in several instances that the sexual cycles of tropical birds and mammals cannot be manipulated experimentally with light. Yet, there is probably some factor in the environment which influences a timing center in the nervous system. The hypothalamus is probably involved in most species of birds and mammals and perhaps in other groups."

Research: Live trap

Blair, W. Frank. A simple and effective live trap for small mammals, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 191-193, 1 fig.

Author's abstract: "An effective but easily built live trap for small mammals has been used by the Laboratory of Vertebrate Genetics for the last four years. Instructions for building this trap are given, with illustrations and a detailed bill of materials."

Research: Mammal populations

Blair, W. Frank. Techniques for the study of mammal populations, Journ. Mammalogy (Wm. B. Davis, College Station, Tex. $1.00 a copy), 22(2), May 1941, pp. 148-157, 2 figs.

Discussion of selection of study area, size of plots, spacing of traps, baits and nesting material, trapping routine, removing small mammals from the traps, methods of marking, mortality in the traps, trapping records, and calculating areas of home ranges and populations per unit area. Bibliography of 12 titles.

Research: Need of

Ashbrook, Frank G. The need for research in fur animal production, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 139-140.

Author's abstract: "The annual take of raw furs is worth about $50,000,000 and the annual retail turnover is $300,000,000. The United States imports more furs than it produces. Fur animals should be given a prominent position in State and Federal administration of wildlife. A comprehensive program of research is necessary to place fur animals on a comparable basis with other wildlife resources. Such a program should include embryology, genetics, nutrition, and the experimental work should be conducted by competent scientists in public institutions.

Research: Rodent dens

Hedges, R. Frank. A method for determining extent of rodent dens, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(2), April 1941, pp. 129-130, 1 fig.

Author's abstract: "Extent of rodent dens in earth dams is determined by forcing smoke from an automobile exhaust through the burrows. Since the normal exhaust of an automobile does not provide sufficient smoke, a smoke-producing agent must be added to the motor fuel. Kerosene was used with excellent results, being added by attaching a small rubber tube to the windshield-wiper coupling on the intake manifold and submerging the free end of the tube in kerosene. The smoke from the automobile exhaust is conducted to the burrow entrance through a garden hose, which is connected to the exhaust pipe by an inexpensive adapter. The adapter is made of a 14-inch length of rubber connection-hose which is large enough to fit over the end of the garden hose and the end of the exhaust pipe. The two joints are secured by hose-connection clamps. This method was used in investigating the burrows of kangaroo rats, but it is believed that it will work as well on the burrows of other rodents."

Research: Sampling vegetation

Canfield, R. H. Application of the line interception method in sampling range vegetation, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 39(4), April 1941, pp. 388-394, 3 figs., 1 table.

Author's abstract: "The line interception method as herein described is designed for measuring density and composition of herbaceous vegetation and shrubs. It is based primarily on the line transect. However, it incorporates a new technique for obtaining an inventory of the vegetation by line measurement of individual plants on a randomly selected sample. It appears to offer a practical, rapid and statistically sound means for sampling vegetation on both large and small range areas, as well as on small plots used in detailed and intensive studies. Field tests have demonstrated that subjective influences are largely eliminated as factors affecting inventories so obtained. The method while primarily developed for range studies should also serve equally well to measure minor vegetation and stands of reproduction in forests."

Research: Scat identification

Webb, John. Identification of rodents and rabbits by their fecal pellets, Trans. Kansas Acad. Sci. (Roger C. Smith, Sec'y., Manhattan), 43, 1940, pp. 479-481, 1 fig.

Key to, and descriptions and figures of, fecal pellets of 15 genera.

Research: Seed identification

Plitt, Thora M. Seed impressions on plastic films, Plant Physiology (N. Queen St. and McGovern Ave., Lancaster, Pa. $2.50 a copy), 16(2), April 1941, pp. 422-424, Pl. 5.

Extension of the method of study developed for hairs (see WILDLIFE REVIEW, No. 30, March 1941, p. 39) to the sculpturing of seeds. Directions, samples of results.

Research: Trapping, Geomys

Sherman, H. B. A box trap for the capture of live Geomys, Journ. Mammalogy (Wm. B. Davis, College Station, Tex. $1.00 a copy), 22(2), May 1941, pp. 182-184, 3 figs.

Description and illustration of the trap and a shipping container.

WILDLIFE LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C.

179. National wildlife refuges administered by the Fish and Wildlife Service, 8 pp., March 1941.

Tabulation arranged by States and Territories giving the name, location, date of establishment, and acreage of the refuges, and notes on the principal species they protect. The total number is 267 and acreage, 13,740,304.

180. Aids for bird study, 9 pp., March 1941.

A bibliography of available official publications on birds and also of commercially published books on identification, distribution, and habits of birds, and on the special subjects of bird-banding, economic ornithology, game birds and game management, flight, life history, migration, oology, photography, song, taxidermy, and territorialism. Names and places of publication of ornithological magazines also are given and the addresses of sources of educational leaflets, colored pictures, and charts, bird lectures, lantern slides and motion pictures, field glasses, telescopes, and taxidermist's and naturalist's supplies. The names of the principal ornithological societies and the addresses of officers also are provided.

181. The control of skunks, by Dorr D. Green and Ernest M. Mills, 4 pp., March 1941.

Habits, nuisance and damage attributable to skunks, and signs of their presence. Skunks are mostly beneficial to man but in special circumstances require control. Directions are given for trapping and disposal of the animals.

182. Some publications of interest to upland game bird breeders, 7 pp., March 1941.

Bibliography of available official documents and of other pertinent books, pamphlets, and periodicals, both American and foreign.

183. Some publications of interest to waterfowl breeders, 4 pp., March 1941.

Bibliography of available official documents and of other pertinent books and periodicals, both American and foreign.

185. The preparation of blood smears and tissue impressions for laboratory study, by Don R. Coburn, 2 pp., 1 pl., April 1941.

Directions for, and illustrations of, an approved method.

186. Available publications on wildlife, 9 pp., April 1941.

Latest revision of the list of available publications of the Fish and Wildlife Service, excluding those relating to fishes. Instructions for obtaining them.

190. Directions for destroying crawfishes, 2 pp., May 1941.

Directions for fumigating burrows with carbon disulfide and treating them with a coal-tar and creosote cattle dip.

NOTES AND NEWS

The first issue of the Pittman-Robertson Quarterly has appeared. Though dated January 1941, it was not available for distribution until June. It is a processed publication of the U. S. Fish and Wildlife Service devoted to the work of Federal Aid to the States in Wildlife Restoration. The leaflet in hand contains two special articles that are abstracted in preceding pages, a list of approved new projects by States, abstracts of quarterly reports upon State activities in the program, and miscellaneous notes.

Hemp seeds are valuable as food for certain animals both captive and wild, but the supply is likely to decrease under the campaign being waged against hemp on account of its use as a narcotic. Those desiring information on Federal law relating to this plant should apply to the Opium Research Committee, 1200 National Press Bldg., Washington, D. C., for its booklet, "Marihuana. A new dangerous drug" (48 pp., illus., March 1938). This brochure describes and illustrates the hemp plant and its seeds, gives its history as a drug, cites international restrictions on traffic in it, discusses Usonian legislation concerning it, and tells how the plant and its products may be identified.

A publication of the Marin Conservation League (76 Madrone Ave., San Anselmo, Calif.), entitled "Exploring Marin" (16 pp., illus., by Sally Carrighar) is unusual in calling attention to botanical and zoological, as well as historical, features of interest to tourists.

The Conservation Commission, State of Missouri (Jefferson City), has issued in mimeographed form 7 pages of details as to the Macon County hawk and owl investigation, a brief report upon which was noticed in WILDLIFE REVIEW, No. 30, March 1941, pp. 18-19.

SPECIAL ARTICLE

Groups of economic plants valuable for wildlife utilization and erosion control

This compilation deals with the plant groups treated in U. S. Department of Agriculture Circular 412 (11 pp., 7 pls., 1936), to the title of which the single word "economic" has been added to form the above heading.

The first draft was prepared at the instigation of the Division of Federal Aid in Wildlife Restoration, with the thought that farmers might be more readily interested in wildlife and erosion control plantings if the species recommended had some direct value to man.

That idea is appealing but it has a drawback. If too much emphasis is put upon values that can be realized only by removal of part or all of certain plants, the purpose of the wildlife plantings may be, in part, defeated. In consuming things supposedly planted for it, wildlife would then come to be regarded as a competitor with the farmer and would be, correspondingly, condemned. If a reasonable attitude is taken, however, this clash may be avoided. It would be well to omit from wildlife plantings in which the economic appeal is involved, species of importance for livestock browsing or grazing as well as those usually grown as crops.

It can do no harm to point out the value of all wildlife plantings in increasing the attractiveness of the farm, not only for the resident family but for paying boarders if any are taken. It should not be forgotten, moreover, that many products of wildlife plantings, even if not marketed, have a distinct value in the economy of the farm. Among them are greens; medicinal herbs; fruits used fresh or made into preserves and jellies, or in the preparation of wines or other drinks; and wood for posts, poles, lumber, wedges, levers, and fuel. The practical values of hedges, windbreaks, and erosion control plantings also are great.

The plant groups listed below are in systematic order. Abbreviations signify the lists in Circular 412 in which the group is included: C (cover), B (browse), H (herbage), M (mast), F (fruit), and S (seed). Indications of economic value are given at somewhat greater length. Completeness can not be hoped for, as the subject is practically inexhaustible.

Annotated Systematic List

Woodfern (Dryopteris).--H.
D. filix-mas and D. marginalis (male ferns), northern States, rootstocks medicinal.

Bracken (Pteridium).--H.
General, young shoots used for greens, and rootstocks eaten cooked or ground and made into bread.

Pine (Pinus).--C, B, S.
General, lumber, pulp, fuel, Christmas trees; turpentine, rosin, tar in the Southeast. Pinons (P. edulis, P. cembroides, and P. monophylla), southwestern States, P. lambertiana and P. sabiniana), California, demand for the "nuts" is greater than the supply. Eastern white pine (P. strobus), northeastern States, inner bark medicinal.

Larch (Larix).--B.
North, fence posts, poles, ties, fuel; tamarack (L. americana), northeastern States, inner bark medicinal.

Spruce (Picea).--C, B, S.
North and mountains, lumber, poles, masts, pulp, Christmas trees. Black spruce (P. mariana), northeast, spruce gum; this species and the red spruce (P. rubra) yield the twigs used in making spruce beer.

Hemlock (Tsuga).--C, B, S.
North and mountains, lumber, pulp, tanbark. Northern hemlock (T. canadensis), northeastern States, inner bark and resin medicinal; twigs used for tea.

Douglas fir (Pseudotsuga taxifolia).--C, B.
Northwest, lumber, masts; twigs used for tea.

Fir (Abies).--C, B, S.
North and mountains, lumber, pulp, Christmas trees. Balsam-fir (A. balsamea), northeastern States, Canada balsam, "spruce" gum, inner bark and resin medicinal.

Arborvitae (Thuja).--C, B.
North and mountains, posts, poles, shingles. American arborvitae (T. occidentalis), northeastern States, Christmas sprays; branchlets medicinal.

White cedar (Chamaecyparis).--C, B.
Northeast and northwest, lumber, posts, poles, ties, shingles.

Juniper (Juniperus).--C, F, F.
General, posts, pencil wood, cabinet material, Christmas trees. Common juniper (J. communis), northern States, berries for medicinal and flavoring purposes; distillation for volatile oil.

Joint-fir (Ephedra).--B.
Southwest, several species, plants medicinal, also used for tea.

Beardgrass (Andropogon).--S
Prairie beardgrass (A. scoparius) and bluejoint turkeyfoot (A. furcatus), eastern Great Plains, and silver beardgrass (A. saccharoides), Texas, wild hay.

Switchgrass (Panicum).--H, S.
P. virgatum, Kansas to Texas, wild hay.

Canary grass (Phalaris).--S.
Reed canary grass (P. arundinacea), northern Mississippi Valley, marsh hay.

Needlegrass (Stipa).--H, S.
Needle-and-thread (S. comata), northern Great Plains, wild hay.

Wheatgrass (Agropyron).--H.
Couch grass (A. repens), northern States, rootstocks medicinal. Bluestem (A. smithii), northern Great Plains, wild hay.

Nutgrass (Cyperus).--S.
Chufa (C. esculentus), general, tubers in some demand.

Sedge (Carex).--H, S.
C. stricta, eastern U. S., packing material.

Palmetto (Sabal).--F.
Extreme southeast, honey plants.

Scrub palmetto (Serenoa).--C, F.
Southeast, honey plants, berries medicinal.

Spanish moss (Tillandsia).--B.
Southeast, mattress stuffing, packing material.

Rush (Juncus).--H.
Common rush (J. effusus), general, mats.

Greenbrier (Smilax).--C, B, F.
Eastern half U. S. and Pacific States. Roots, the source of brier-wood for pipes; those of several species are medicinal.

Walnut (Juglans).--M.
Butternut (J. cinerea), northeastern U. S.; nuts; leaves and bark of the root medicinal. Black walnut (J. nigra), eastern U. S., lumber, veneer, furniture, gunstocks, nuts extensively marketed. The hulls of both of these nuts are sources of dye.

Hickory (Hicoria).--B, M.
Eastern half U. S., lumber; basket, handle, and wheel stock; nuts, the latter marketed to some extent.

Waxmyrtle (Myrica).--B, M.
Mostly near coasts, bark, berries, and leaves medicinal; wax covering of the berries made into candles. Sweet gale (M. gale), north, leaves used as a condiment and for tea.
Sweetfern (Comptonia peregrina).--C, B.
Northeast, plant medicinal.

Poplar (Populus).--B.
General, aspen type, boxwood, excelsior, pulp, good source of pollen for bees. American aspen (P. tremuloides), northern States, bark medicinal. Cottonwood type, lumber, boxwood, cooperage, excelsior. Balm-of-gilead (P. candicans), northeastern States, buds medicinal.

Willow (Salix).--C, B.
White willow (S. alba), northeast, poles, posts, fuel. Black willow (S. nigra), general, cooperage, excelsior, pulp, charcoal, fuel; bark and fresh ament medicinal. Purple willow (S. purpurea), northeast, basketry. Willows in general are good sources of nectar and pollen for bees.

Blue beech (Carpinus caroliniana).--B, S.
Eastern half U. S., posts, handles, levers, wedges, fuel.

Hophornbeam (Ostrya virginiana).--B, S.
Eastern half U. S., posts, handles, levers, wedges, fuel; inner bark medicinal.

Hazel (Corylus).--C, B, M.
Eastern half U. S., northwest coast, nuts.

Birch (Betula).--C, B, S.
General, lumber, cooperage, handle stock, turnery, small wares, pulp, fuel. Black birch (B. lenta), northeastern U. S., furniture, woodenware, fuel; distillation for a volatile oil; bark medicinal; twigs used for tea. Yellow birch (B. lutea), northeastern States, furniture, flooring, interior finish, veneer.

Alder (Alnus).--C, B, S.
Hazel alder (A. rugosa), eastern U. S., bark medicinal. Western species: cabinet wood, fuel.

Beech (Fagus grandifolia).--B, M.
Eastern U. S., lumber, handle and cooperage stock, veneer, fuel; nuts sometimes marketed where plentiful.

Chinquapin (Castanea pumila).--B, M.
Nuts; bark medicinal.

Giant chinquapin (Castanopsis chrysophylla).--M.
Pacific States, lumber, nuts.

Oak (Quercus).--C, B, M.
General; the oaks supply much mast for hog food, certain species produce acorns edible by man, and oaks in general serve as good sources of pollen for bees. The white oak species are of value for lumber, cooperage, handle and wagon stock, furniture, veneer, poles, posts, mine props, ties, fuel, and tanbark. The inner bark of the true white oak (Q. alba), eastern U. S., is medicinal. The red oaks also are in demand for lumber, veneer, poles, posts, mine props, ties, fuel, and tanbark. Bark of the black oak (Q. velutina) yields the yellow dye, quercitron. The live oak (Q. virginiana), southeast, is reported to be a good honey plant.

Elm (Ulmus).--B.
White elm (U. americanus), eastern U. S., lumber, cooperage, handles, hubs; honey plant. Slippery elm (U. fulva), eastern U. S., cooperage, posts; inner bark medicinal.

Hackberry (Celtis).--B, F.
General, honey plants; fruit edible. C. occidentalis, eastern U. S., box wood, cooperage, fencing, cheap furniture.

Mulberry (Morus).--F.
General, cooperage, poles, posts, ties, fruit.

Osage orange (Toxylon pomiferum).--C, F.
Southern Great Plains, but widely transplanted; bows, hubs, poles, posts, treenails; yellow dye.

Wild buckwheat (Eriogonum).--B, H, S.
E. fasciculatum, California, honey plant. E. inflatum, southwest, stems eaten raw and pickled.

Dock (Rumex).--H, S.
General, potherbs; roots medicinal. Canaigre (R. hymenosepalus), southwest, tannin.

Smartweed (Polygonum).--H, S.
Heartweed (P. persicaria), general, potherb, salad, honey plant; some of the species as P. virginianum, eastern half U. S., P. hydropiper and P. punctatum, general, are medicinal.

Goosefoot (Chenopodium).--H.
Lambsquarters (C. album), general, potherb; other species also sometimes so used. Mexican tea (C. ambrosioides), general, medicinal.

Strawberry-spinach (Blitum capitatum).--H.
Northern half U. S., potherb.

Glasswort (Salicornia).--H.
Saline soils, stems used for pickles.

Greasewood (Sarcobatus).--B.
Southwest, tender twigs and leaves used for greens.

Russian thistle (Salsola).--H, S.
North, young shoots used for greens.

Redroot (Amaranthus).--S.
General, potherbs.

Pokeberry (Phytolacca americana).--F.
Eastern U. S., rootstocks and berries medicinal; young shoots used for greens.

Indian lettuce (Montia).--S.
M. perfoliata, Pacific coast and southwest, potherb.

Purslane (Portulaca).--H, S.
P. grandiflora, Texas, honey plant. P. oleracea, general, potherb, medicinal.

Common chickweed (Alsine media).--H, S.
General, potherb.

Magnolia (Magnolia).--S.
Eastern half U. S., lumber, excelsior, veneer; bark medicinal; honey plants

Tuliptree (Liriodendron tulipifera).--S.
Eastern U. S., lumber, excelsior, veneer; bark medicinal; honey plant.

Wild columbine (Aquilegia canadensis).--H.
Eastern half U. S., medicinal.

Moonseed (Menispermum canadense).--F.
Eastern U. S., roots medicinal.

Bay (Persea).--F.
Red bay (P. borbonia), southeast, lumber, cabinet work; distillation for volatile oil; leaves used as a condiment.

California laurel (Umbellularia californica).--F.
Western Oregon and California, cabinet and trim wood; leaves medicinal, also employed as a condiment.

Sassafras (Sassafras sassafras).--B, F.
Eastern half U. S., posts, rails, cooperage, fuel; pith medicinal; bark of the roots medicinal, also used for flavoring and for tea; distillation for volatile oil; leaves used as a condiment.

Spicebush (Benzoin).--F.
Eastern half U. S., bark medicinal; twigs used for tea, fruits as a condiment.

Mustard (Brassica).--H, S.
Black mustard (B. nigra), general; seeds medicinal and condimental; distillation for volatile oil; honey plant.

Shepherd's purse (Bursa bursa-pastoris).--S.
General, potherb, salad, medicinal.

Sweet gum (Liquidambar styraciflua).--S.
Southeastern third U. S., yields a balsamic gum; bark medicinal.

Witch-hazel (Hamamelis virginiana).--B.
Eastern U. S., leaves, bark, and twigs medicinal; distillation for volatile oil.

Sycamore (Platanus).--B.
General, lumber, butcher blocks, box wood, cooperage, veneer.

Hawthorn (Crataegus).--C, B, F.
General, honey plants; fruits used locally; that of the mayhaw (C. aestivalis), southeast, and river hawthorn (C. rivularis), northwest, extensively employed for making jelly.

Mountain-ash (Sorbus).--B, F.
American mountain-ash (S. americana), northeastern States, bark and berries medicinal.

Toyon (Heteromeles arbutifolia).--F.
California, Christmas sprays; honey plant; fruit edible.

Serviceberry (Amelanchier).--B, F.
General, the berries are marketed locally in northern States.

Blackberry and raspberry (Rubus).--C, B, F.
General, bark of the root medicinal; fruits used for food and for medicinal and flavoring purposes; honey plants.

Strawberry (Fragaria).--H, F.
General, fruits of wild plants everywhere eaten and in some places gathered and marketed.

Cinquefoil (Potentilla).--H.
Silverweed (P. anserina), north, leaves medicinal, roots edible.

Plum (Prunus).--C, F.
General, honey plants; fruits used both fresh and preserved. Beach plum P. maritima), northeast coast, fruit of local commercial importance.

Catclaw (Acacia).--C, B, S.
A. greggii, southwest, lac; honey plant.

Mesquite (Prosopis).--C, B.
Southwest, honey plants; pods cooked and eaten when green, and when ripe used for meal and bread.

Screwbean (Strombocarpa).--H.
Southwest, pods eaten fresh and when made into meal and cakes; also used in the preparation of a drink and of a crude molasses.

Redbud (Cercis).--B.
General, except northwest, honey plants.

Senna (Cassia).--S.
C. marilandica, northeastern States, leaves medicinal. C. occidentalis, southeast, seeds used as a substitute for coffee.

Partridge pea (Chamaecrista).--C, S.
C. fasciculata, eastern U. S., honey plant.

Ratany (Krameria).--B.
Southern border, roots medicinal.

Honeylocust (Gleditsia).--B, S.
G. triacanthos, eastern U. S., poles, posts, mine props, ties; honey plant.

Jerusalem thorn (Parkinsonia).--B.
Southwest, honey plants; bark medicinal.

Bur-clover (Medicago).--H, S.
M. denticulata, California, honey plant.

Sweetclover (Melilotus).--S.
General, honey plants; flowers medicinal.

Clover (Trifolium).--H, S.
General, honey plants; flowers medicinal.

Birdsfoot trefoil (Lotus).--H.
Deerweed (L. scoparius), California, honey plant.

Locust (Robinia).--C, B, S.
Black locust (R. pseudoacacia), eastern U. S., masts, poles, posts, mine props, ties; honey plant; root bark medicinal.

Sesbania (Sesban).--S.
S. macrocarpa, southeast, yields a strong fiber.

Pencil flower (Stylosanthes).--S.
S. biflora, eastern half U. S., medicinal.

Hogpeanut (Amphicarpa).--H, S.
Eastern half U. S., seeds from the underground pods edible.

Geranium (Geranium).--H, S.
Cranesbill (G. maculatum), eastern U. S., and herb Robert (G. robertianum) northeastern fourth U. S., roots medicinal.

Alfilaria (Erodium).--H, S.
Most abundant in the West, honey plants; medicinal.

Wood sorrel (Oxalis).--H.
Eastern half U. S., salad, medicinal.

Prickly-ash (Zanthoxylum).--C.
Eastern half U. S., honey plants; bark and berries medicinal.

Chinaberry (Melia azedarach).--F.
Southern U. S., honey plant; bark medicinal.

Turkey mullein (Eremocarpus setigerus).--S.
California, medicinal.

Queen's delight (Stillingia sylvatica).--S.
Southeastern States, roots medicinal.

Jojoba (Simmondsia californica).--C.
Southwest, seeds edible raw and used cooked as a substitute for chocolate.

Peppertree (Schinus molle).--F.
California, honey plant.

Sumac (Rhus).--C, B, F.
General, honey plants; source of tannin. Leaves, bark, and berries of several species medicinal; fruits of various species used in making sour drinks.

Holly (Ilex).--C, F.
Eastern half U. S., several evergreen species used for Christmas decorations; apparently all are good honey plants. American holly (I. opaca), eastern U. S., wood good for turnery; leaves and fruit medicinal. Youpon (I. vomitoria) and dahoon (I. cassine), southeast, inkberry (I. glabra), Atlantic States, and winterberry (I. verticillata), eastern half U. S., leaves used for tea; bark and berries of the last-named medicinal.

Burningbush (Euonymus).--S.
Wahoo (E. atropurpureus), eastern U. S., bark medicinal.

Bittersweet (Celastrus scandens).--C, S.
Northeastern fourth U. S., Christmas decorations, bark medicinal.

Maple (Acer).--B, S.
General, honey plants. Hard maples (A. saccharum, nigrum, drummondi, and macrophyllum) yield high quality lumber that is used for furniture, flooring, veneer, cooperage, and handle stock, also for fuel; maple sugar is largely the yield of the first of these species. Soft maples (A. saccharinum, rubrum, and carolinianum) yield a lower grade but still extensively used lumber that is made into cheap furniture, flooring, and woodenware.

Jewel-weed (Impatiens).--H, S.
Eastern half U. S., potherb, medicinal.

Squawbush (Condalia).--F.
Southwest, honey plants.

Supplejack (Berchemia scandens).--F.
Southeast, honey plant.

Jersey tea (Ceanothus americanus).--C, B, S.
Eastern U. S., leaves used for tea; bark, leaves, and roots medicinal.

Wild grape (Vitis).--C, B, F.
General, honey plants but even more valuable as a source of pollen for bees; fruits used locally fresh, and for jelly and wine.

Virginia creeper (Parthenocissus quinquefolia).--C, F.
Eastern half U. S., bark medicinal.

Treebine (Cissus).--F.
Southeastern quarter U. S., honey plants.

Basswood (Tilia).--B.
Eastern half U. S., lumber, excelsior, veneer, cooperage, drawing boards, woodenware; honey plants. American linden (T. americana), eastern U. S., flowers medicinal.

Mallow (Malva rotundifolia).--S.
General, potherb.

Saltcedar (Tamarix).--C.
Southwest, fuel.

Violet (Viola).--S.
Bird's-foot violet (V. pedata), eastern half U. S., medicinal.

Passionflower (Passiflora).--F
Maypop (P. incarnata), southeast, stem-base and roots medicinal; fruit used fresh and in jelly.

Pricklypear (Opuntia).--C, B, F.
General, honey plants; fruits (tunas) of some of the southwestern species are locally marketed.

Daphne (Daphne mezereum).--F.
Northeast, bark medicinal; fruit used as a condiment.

Leatherwood (Dirca).--F.
Eastern half U. S. and California, bark medicinal; also used for withes.

Silver buffaloberry (Lepargyrea argentea).--C, B, F.
Northwest, berries edible and much used for jelly.

Elaeagnus (Elaeagnus).--C, F.
Silver-berry (E. argentea), northwest, berries edible. Russian olive (E. angustifolia), introduced, general, honey plant.

Fireweed (Chamaenerion).--H.
C. angustifolium, northern States, potherb, honey plant.

Evening-primrose (Oenothera).--H, S.
O. biennis, eastern U. S., plant medicinal; root edible.

Aralia (Aralia).--F.
Eastern half U. S., bark and roots medicinal.

Lovage (Ligusticum).--H.
North and west, roots medicinal.

Angelica (Angelica).--B, H.
A. atropurpurea, northeastern States, and A. villosa, southeast, roots and seeds medicinal.

Cow parsnip (Heracleum lanatum).--H.
North and mountains, root and seeds medicinal.

Tupelo (Nyssa).--F.
Eastern U. S., honey plants. Sourgum (N. sylvatica), lumber used for crates, hubs, rollers, ties.

Dogwood (Cornus).--C, B, F.
General, bark of several species medicinal. Flowering dogwood (C. florida), eastern U. S., the wood is used for bobbins, handles, shuttles, and other turnery.

Shinleaf (Pyrola).--H.
North and mountains, medicinal.

Trailing arbutus (Epigaea repens).--B.
Northern and eastern States, leaves medicinal.

Wintergreen (Gaultheria).--C, B, F.
G. procumbens, northeastern fourth U. S., leaves medicinal; distilled for volatile oil; fruit edible, sometimes marketed. Salal (G. shallon), northwest, fruit edible.

Manzanita (Arctostaphylos).--C, B, F.
General except southeastern third U. S., honey plants, leaves medicinal; fruits used in the west for making jelly and refreshing drinks.

Huckleberry (Gaylussacia).--C, B, F.
Eastern half U. S., berries marketed locally.

Blueberry (Vaccinium).--C, B, F.
General, berries everywhere eaten raw or cooked and marketed on a large scale.

Bumelia (Bumelia).--F.
Southern half U. S., honey plants.

Persimmon (Diospyros).--F.
Eastern half U. S., honey plants. D. virginiana, eastern U. S., wood used for a few specialties as golf-club heads, shoe-lasts, and shuttles; fruit.

Ash (Fraxinus).--B, S.
General, bark and leaves medicinal. The more valuable species exemplified by the white ash (F. americana), eastern U. S., yield a high grade lumber that is used for furniture, interior trim, cooperage, handle stock, and woodenware; less valuable forms like the black ash (F. nigra) are used for hoops, baskets, and chair bottoms.

Fringetree (Chionanthus virginica).--F.
Southeastern fourth U. S., root bark medicinal.

Privet (Ligustrum).--F.
General in cultivation, honey plants.

Elkweed (Frasera).--H.
American columbo (F. carolinensis), northeast, medicinal.

Skunkweed (Polemonium).--H.
Greek valerian (P. reptans), northeastern quarter U. S., root medicinal.

Bluebells (Mertensia).--H.
M. virginica, northeastern quarter U. S., medicinal.

Puccoon (Lithospermum).--H, S.
General, roots yield a yellow dye.

Vervain (Verbena).--S.
General, honey plants. Blue vervain (V. hastata), general, medicinal. European vervain (V. officinalis), eastern half U. S., medicinal, leaves used for tea. White vervain (V. urticifolia), eastern half U. S., medicinal.

Lantana.
L. camara, Florida, leaves used for tea, also medicinal.

Lippia (Lippia).--S.
General, honey plants.

Bluecurls (Trichostema).--S.
T. lanceolatum of the Pacific Coast is an important honey plant. T. lanatum, California, medicinal.

Sage (Salvia).--C.
General, honey plants, especially the black (S. mellifera), and white (S. apiana), sages of California. The seeds of chia (S. columbariae), southwest, are used in preparing both food and drink.

Matrimony-vine (Lycium).--C, B.
L. andersonii, L. pallidum, southwest, fruit edible.

Speedwell (Veronica).--H.
V. officinalis, northeastern fourth U. S., leaves medicinal.

Desert willow (Chilopsis linearis).--C.
Southwest, posts.

Plantain (Plantago).--H.
General, medicinal.

Buttonbush (Cephalanthus occidentalis).--S.
General except northwest, honey plant; bark medicinal.

Partridgeberry (Mitchella repens).--H, F.
Eastern half U. S., medicinal; fruit edible.

Mexican clover (Richardia scabra).--H.
Southeast, root medicinal.

Buttonweed (Diodia).--S.
D. teres, eastern half U. S., honey plant.

Cleavers (Galium).--H, S.
G. aparine, eastern half U. S., and G. mollugo, northeastern quarter U.S., medicinal. G. tinctorium, northeastern two-thirds U. S., yields a red dye. G. verum, northeast, coagulates milk, medicinal.

Elder (Sambucus).--B, F.
S. canadensis, eastern half U. S., honey plant; bark, flowers, and fruits, medicinal; fruit used for pies, jelly, and wine; so also is that of S. glauca, northwest.

Black haw (Viburnum).--B, F.
General except southwest, bark medicinal. V. rufotomentosum of the southeastern States is reported to be a good honey plant. V. cassinoides, northeast, leaves used for tea. Fruits of several species edible.

Snowberry, coralberry (Symphoricarpos).--C, B, F.
General, honey plants.

Honeysuckle (Lonicera).--C, B, F.
General. The bush honeysuckles with short corollas are good honey plants; bearberry honeysuckle (L. involucrata), northwest, fruit edible.

Valerian (Valeriana).--H.
General, roots medicinal. V. edulis, northwest, roots baked and eaten.

Rabbitbrush (Chrysothamnus).--C, B.
C. nauseosus, southwest, honey plant.

Niggerhead (Rudbeckia).--H.
Green-headed cone-flower (R. laciniata), northeast half U. S., medicinal.

Wyethia.--H.
W. helenioides, California, medicinal.

Sunflower (Helianthus).--S.
General, honey plants; seeds edible. Jerusalem artichoke (H. tuberosus), tubers edible.

Helianthella.--H.
H. tenuifolia, Florida, medicinal.

Bur-marigold (Bidens).--S.
General, honey plants; roots and seeds medicinal.

Tarweed (Hemizonia).--S.
California, honey plants.

Yarrow (Achillea).--H.
General, plant medicinal.

Sagebrush (Artemisia).--C, B, H.
Wormwood sage (A. frigida), Great Plains, medicinal; distilled for volatile oil.

Arnica.--H.
General, roots and leaves medicinal.

Thistle (Cirsium).--H, S.
General, honey plants; roots of C. edulis and C. foliosum, northwest, edible.

Star-thistle (Centaurea).--H, S.
Napa thistle (C. melitensis), California, honey plant. Two introduced species, C. calcitrapa and C. nigra, are medicinal.

Dandelion (Taraxacum).--H, S.
Common dandelion (T. taraxacum), general, potherb, roots medicinal.

Sowthistle (Sonchus oleraceus).--S.
General, potherb.

Wild lettuce (Lactuca).--H, S.
Prickly lettuce (L. scariola), general, leaves medicinal; the juice of L. canadensis, general, L. hirsuta, eastern U. S., and L. sagittifolia, northeastern quarter U. S., is mildly narcotic; all of these are used as potherbs.

Hawkweed (Hieracium).--H.
H. gronovii, eastern half, and H. scabrum, northeastern quarter, U. S., are used for relief of toothache; and H. venosum, northeastern quarter U. S., is medicinal.

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WILDLIFE REVIEW

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Washington, D. C. No. 32 November, 1941

Classification: Birds

Friedmann, Herbert. The birds of North and Middle America, U. S. Nat. Mus. Bul. 50, Part IX (Supt. of Documents, Washington, D. C. 40 cents a copy), ix+254 pp., 16 figs., 1941.

This volume in continuation of the series carried through Part VIII by Robert Ridgway is most welcome. Those who do not know of it, will be glad to learn that manuscript on the hawks and allies (Falconiformes) has been prepared and on the grouse, quail, etc. (Galliformes) is in preparation. To keep the reports in systematic sequence, it is planned to issue the last-named before that on the hawks. The present installment, covering the cranes, rails, coots, gallinules, sun-grebes, and sun-bitterns, is continued in the same style as the previous parts, giving full synonymy and bibliography of each group, detailed descriptions of all plumages, measurements, and outline of range. The chief structural characters of each genus are illustrated. Ornithologists will look forward eagerly to the appearance of succeeding installments and the final completion of this greatest work on North American birds.

Classification: Rattlesnakes

Gloyd, Howard K. The rattlesnakes, genera Sistrurus and Crotalus, Chicago Acad. Sci. Special Publ. 4, 270 pp., 31 pls., 21 figs. (mostly maps), 1940.

Review of literature (17-page bibliography), key to species and subspecies (principal characters illustrated), and annotated accounts, including synonymy, history, description, statement of distribution, locality records, and comment on variation and affinities. The general summary contains discussion of the rattle, size and form, scutellation, coloration, specializations and center of origin and dispersal.

Conservation: Dangers of commercialization

Beard, Daniel B. Feathers and furs, National Park Service Region Three Quarterly (Santa Fe, New Mexico), 3(4), Oct. 1941, pp. 2-7, 3 photos, (mimeographed).

The dangers of commercialization to animals are pointed out, the plume birds, beaver, alligator, sea lions, diamond-back terrapin, and certain fur animals being commented upon as victims. "Strange to relate, industries that have been dependent upon a perpetual supply of some wildlife species for their very existence have seldom favored conservation. They tend to go after all they can while they can, and make as much money as possible before the species become extinct. And unless something is done about it, extinction is almost certain because when a wildlife species is exploited for commercial purposes--when feathers, hair, body, or bones become an article of commerce--that species is 'on the skids.'" The author reports recent development of a more cooperative attitude on the part of businessmen--a matter for congratulation.

Conservation: Feather trade abuses

Anon. Wild birds and fly-fishing. Is America big enough for both?, National Audubon Society (1006 Fifth Ave., New York, N. Y.) Circular 47, 12 pp., illus. 1941. (10 cents a copy).

"In 1922, when the tariff law was revised, a few additional words were added to the bill, in some way which has not yet been explained, making it legal as well to import the feathers of wild birds, providing affidavits were filed declaring that the plumage was imported and was to be used only for the manufacture of fish-flies. This record has been cited to make it clear that, from the beginning of its new campaign to obtain adequate protection for wild bird life, the National Audubon Society has pointed out that fly-fishermen, as well as manufacturers and importers of fish-flies and feathers, were wittingly or unwittingly contributing to the difficulties of giving adequate protection to wild bird life." The pros and cons of the situation are discussed in the light of the New York law which will end all traffic in wild bird plumage in that State in 1947. Complete removal of commercial incentives to the exploitation of birds seems the only safe course. The ethics of anglers have already developed along desirable lines and it is held that the further step of abandoning use of the feathers of wild birds for fish-flies should not be unsurmountable.

Conservation: Fur animals

MacLeod, Alexander T. The importance of fur resources in wildlife administration, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 68-72.

"Fur is an important commercial commodity and more of it is consumed in the United States than in any other country in the world." The annual take of fur animals is estimated to be worth about 40 to 45 million dollars, and the sales of fur products at retail reaches approximately 275 million dollars. Because we have squandered an originally bounteous natural supply of furs, we now face the alternative of achieving more effective fur-animal conservation and restoration or becoming still further dependent on furs of foreign origin. The restoration of fur animals should have a place in land planning programs, especially as it may be done at a profit. Better control of trapping, including adequate reporting of the catch, and closer cooperation between all factions interested in the fur industry, are required.

Conservation: Fur animals

Wade, Douglas. Fur, fish, and game--some suggested relationships, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 314-319, 5 tables.

Between 1926 and 1938, the fur catch in Pennsylvania had a cash value of nearly 14-1/2 million dollars, exceeding in that respect any one of 16 State agricultural products. The data are recorded in tables. Trappers take animals other than furbearers; their reports on the subject are tabulated;

some useful, but more numerous injurious, species are among them. The value of research upon fur animals is emphasized and a plea made for its expansion. Furbearers benefit by environmental improvements made for other species but deserve to be mentioned in arguments for restoration projects. A table is presented showing that 5 percent of the papers appearing in the Transactions of North American Wildlife Conferences, 1936-41, and the question asked, Is that enough?

Conservation: Musk ox

Yarham, E. R. Canada's fight for the musk oxen, American Forests (919 Seventeenth St., N. W., Washington, D. C. 35 cents a copy), 47(9), Sept. 1941, pp. 424-425, 448, 1 photo.

Once numbering probably a million, the animals have been reduced to about 25,000. Former and present distributions are compared and the habits of the species sketched. Comment on slaughter, especially in Greenland, and on efforts by the Canadian government to preserve the species.

Conservation: National program

Gabrielson, Ira N. The future for conservation, Trans. Sixth N.A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 27-36.

In 1936 the author outlined a national wildlife program; in this paper he reports on progress in Federal and State refuge acquisition, in cooperation between State and national agencies in research and restoration, in recognition of wildlife in land planning programs, in the curbing of pollution, expansion of research, coordination of the activities of Federal land administrative organizations, and in regulating the utilization of wildlife. Results have been encouraging in each of these fields except that of control of pollution. For the future the author urges increased effort toward the restoration of fur animals, better management of fish stocking, preservation of the natural purity of our waters, control of erosion by attention to headwaters, cooperative financing of fisheries research, and resisting menaces to wildlife brought forth in the guise of national defense.

"May I remind you, in closing, that in conservation we may win many contests but if we lose the last one we lose the war. An unwise project for the destruction of natural resources may be defeated fifty times, but if it wins the fifty-first time we might as well have lost on the first occasion. We who understand the value and the vital necessity of maintaining natural resources of soil and water and their products, face a continuous job of making other Americans understand the vital character of this program. We face a never-ending battle to hold off those who would sacrifice anything in the future for immediate gain. And make no mistake, there will always be people, many of them ready to do this if they can see profit in it for themselves. The forces of conservation will always have such groups to fight. There are now, and always will be, many who would take the last fish, kill the last bird or the last deer, or cut down the last tree, if in so doing they could realize an immediate

personal gain. It is our duty as American citizens concerned with the national welfare and the future of this country to see that these groups do not prevail."

Conservation: Plume trade

Baker, John. An end to traffic in wild bird plumage, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 16-19.

Review of efforts to control trade in feathers and synopsis of a declaration of policy by the industry under which existing stocks shall be liquidated within 6 years and no others assembled.

Conservation: Waterfowl

Gabrielson, Ira N., and Frederick C. Lincoln. What is behind the waterfowl regulations?, Senate Special Committee on the Conservation of Wildlife Resources (Capitol, Washington, D. C.), Committee Print No. 1, 77th Congress, 1st Session, pp. 3-34, 1 pl., 23 maps.

The regulations are based on research, full consideration being given to biological, recreational, and administrative factors. The services of waterfowl observers and banders and of the field personnel of the Bureau in studying and reporting on migration phenomena are detailed and the distribution of these observers indicated on maps. The principal flyways also are shown on maps and the investigations of the biologists assigned to them are described. The annual January inventory has wide scope and represents a strenuous effort to determine the trend of the waterfowl population. General studies of the Service and bibliographic research have given accurate knowledge of the breeding and wintering ranges of the birds. This has facilitated understanding of the effects on the waterfowl of drought and other factors unfavorably affecting the environment. Above all in the United States "with its great army of hunters, the menace of overshooting is ever present." The major problem is "to so restrict the kill as to insure the return of ample breeding stock to the nesting grounds." Based on all available information, the regulations are intended to achieve that objective.

Control: Bobcat

Young, Stanley P. Hints on bobcat trapping, U. S. Dept. of the Interior, Fish and Wildlife Service (Washington, D. C.), Circular 1, 6 pp., 4 figs., 1941.

Depredations of bobcats are described, and directions given as to where to trap, on the use of blind and scented trap sets, preparation of scent, care in details of trapping, and the desirability of resetting traps.

Control: Bounty system

Gerstell, Richard. The advisability of paying bounties for the killing of predators, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 278-281.

The author summarizes the long experience of the Pennsylvania game department in this field as follows: "It would in summary appear that as a general rule it is for three principal reasons unwise to attempt the control of predators through the payment of bounties.

"First of all, the successful operation of any bounty system depends upon precisely drawn legislation which even under present day conditions is most difficult to achieve.

"Secondly, the advantages of the system are far more than balanced by its disadvantages. For example, the educational benefits derived from the practice can doubtless be better and more efficiently accomplished through the public information divisions of the conservation department, using modern techniques including the motion picture and radio, than by offering rewards for the killing of certain birds and mammals. Also, as already pointed out, the system's principal economic advantages are open to question, while most departments should be in position to obtain more desirable research material through the cooperation of its own personnel and other interested persons than through the collection of specimens killed at random by untrained workers. On the other hand, limited application, inefficiency, and the encouragement of fraud are undesirable factors which cannot be entirely divorced from the operation of the system.

"Finally, though some few particular predator problems can admittedly be solved through the payment of bounties, opportunities for such use of the system are comparatively rare. At the same time, the very possession of the power to declare bounties almost constantly places upon the conservation agency strong, though usually unwarranted demands for application of the system to problems which they do not fit. Unfortunately, most departments are not as yet strong enough to withstand public pressure of this type. Thus, the system is likely to be used not only in cases which it does not fit, but also in others based on fiction rather than fact. Needless to say, that is both undesirable and indefensible."

Control: Corn pulling

Chaddock, T. T. An effective pheasant repellent, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 6(8), Aug. 1941, pp. 46-47.

After tests of several repellents, lead oxide was selected for further trial. It was found to meet nearly all of the requirements of a satisfactory repellent and is cheap. It protects corn from both pheasants and rodents. Directions for its application are given.

Control: Coyote

Young, Stanley P. Hints on wolf and coyote trapping, U. S. Dept. of the Interior, Fish and Wildlife Service (Washington, D. C.), Circular 2, 8 pp., 3 figs., 1941.

Why control of wolves and coyotes is necessary; suggestions as to methods of trapping, including: where to place traps, preparing the sets, scenting, and resetting traps.

Control: Pondweed

Smith, E. V., and H. S. Swingle. The use of fertilizer for controlling the pondweed, Najas guadalupensis, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 245-250, 2 figs.

Description of the problem and the method of solving it; the plant is a serious check upon fish production. Authors' summary: "(1) Najas has been controlled in five fish ponds in Alabama by the use of inorganic fertilizers; (2) the fertilizer induces a heavy growth of algae, either filamentous or plankton, which apparently shades out the Najas; (3) the production of fish food, the growth of fish, and the ease of fishing are improved by the use of fertilizer for the control of Najas."

Control: Predator

Kartchner, K. C. Desirability for control of predators in wildlife management as experienced in Arizona, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 273-276.

The Arizona point of view, with a plea for greater Federal expenditure for hunter control in the State, the bounty system being condemned. Comment on the Kaibab deer situation; it is planned to regulate both hunting and predation so that a herd of about 15,000 animals will be maintained. Suggestion that the National Park Service control predators. The author refers to "a balance of Nature, which as we all know, has been so thoroughly disturbed by man that it can never be restored." This sweeping assertion ignores the fact that restorative processes are always in action, and that any tract surrendered by man is taken over by Nature. Consider the Mayan cities buried by the jungle. The new order may not parallel the original balance but always, everywhere, balance, if not attained, is imminent. See "Biologic balance on the farm" abstracted in WILDLIFE REVIEW, No. 30, March 1941, p. 9.

Control: Predator

Riter, William E. Predator control and wildlife management, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 294-298.

The terms "predator" and "control" are defined and the controversy over these subjects briefly set forth. Predation is only one, but may be a leading, factor in limiting wildlife production. Examples are cited of antelope herds in Oregon, California, and Nevada, and of grouse and turkeys in Georgia, and waterfowl in North Dakota; in each of these instances predator control resulted in rapid increase of previously repressed populations. Stoddard is quoted on the desirability of treating predator control as a local problem. The author's conclusions are: "(1) Predator control as a factor in wildlife management should not be overlooked, although it is but one among many others. Its importance in the success of a wildlife-management plan depends entirely

on local conditions--each area is a problem by itself and all cardinal factors should be studied together and each properly evaluated; (2) predation may be a major factor on (a) areas on which the population of the fostered species is subnormal although other conditions are favorable for their development; and (b) on game areas where any considerable part of the increase that would normally be utilized by man is being taken by predators; (3) where breeding populations of the fostered species remain normal for the area, predator control is of little or no consequence in attempting to increase the numbers of the breeding stock; under such conditions, food, cover, and water during the critical period are generally the limiting factors."

Control: Predators upon quail

Stoddard, Herbert L., and Ed. V. Komarek. Predator control in southeastern quail management, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 283-293.

For an appraisal of the problem, the authors have had available to them information from the study of 2,500 quail nests and of the contents of many mammal stomachs, besides years of field experience of their own and of numerous cooperators. Night-hunting for sport and pursuit of fur animals with dogs is no longer carried on so actively in the South as it has been for a hundred years, and as a result predators have increased. Gray foxes have become so abundant as to suffer an epizootic of rabies, which in turn is a menace to dogs. This species of fox, two of skunks, and the opossum are seriously destructive to quail eggs and young in some years but not in others. Checking the increase of these predators should be routine procedure on quail preserves. Species that break up early nesting attempts of quail are especially destructive, as later broods, even if successful, are lower in numbers and less desirable. Seldom is control of hawks necessary except of the blue darters (Cooper's and sharp-shinned hawks). The killing of other hawks is poor policy as they prey significantly upon snakes that are habitual eaters of quail eggs. Wild turkeys destroy many eggs and chicks of quail and management areas for these two species should be separate. Snakes are kept in some check by paying bounties to tenants, and fire ants should be controlled where it can be economically done by the methods so far developed. The vermin killing attitude is not needed and does not prevail among quail managers.

Control: Pricklypear

Costello, David F. Pricklypear control on short-grass range in the Central Great Plains, U. S. Dept. Agr. Leaflet 210 (Supt. of Documents, Washington, D. C. 5 cents a copy), 6 pp., 3 figs., 1941.

Where control is, and is not, justified; discussion of methods as hand-grubbing, dragging with a railroad iron, and scraping with a road grader.

Control: Spatterdock

Smith, E. V., and H. S. Swingle. Control of spatterdock (Nuphar advena Ait.) in ponds, Trans. Amer. Fisheries Society, 1940 (Investment Bldg., Washington, D. C. $3.00 for the entire volume), pp. 363-368, 3 photos.

Authors' abstract: "Spatterdock (Nuphar advena Ait.) is an objectionable weed in southern ponds where its emergent leaves form a dense vegetation in which it is difficult or impossible to fish. Experiments dealing with the control of this plant were conducted in a pond in Central Alabama during the spring and summer, 1940. The results of these experiments are summarized briefly as follows: (1) Spatterdock was effectively controlled by cutting the leaves five times (May 15, June 4, June 21, July 2, and July 24); (2) four cuttings (June 4, June 21, July 2, and July 24) effectively controlled the plant when commercial fertilizer was applied on the first cutting date; (3) effective control was obtained by pulling the rootstocks on May 15, and allowing the plants to remain in the pond; (4) death and decay of the rootstocks of spatterdock began toward the base and progressed to the apex; (5) sprays consisting of mixtures of creosote and fuel oil, and sodium chlorate and sodium arsenite killed the leaves of spatterdock but did not injure the rootstocks."

Destruction: By a blizzard

Scott, Thomas G., and Thomas S. Baskett. Some effects of the 1940 Armistice Day storm on Iowa's wildlife, Iowa Bird Life (Winthrop, Iowa. 25 cents a copy), 11(2), June 1941, pp. 21-29, 3 pls.

"Among the most destructive blizzards within historic time was one that struck the north-central states on November 11, 1940 x x x considerable destruction of livestock, fruit trees, and wildlife was reported." Authors' summary: "(1) The storm of November 11 took a toll of wildlife in northwestern Iowa. On the Winnebago Area in north-central Iowa, the losses constituted less than 10 per cent of the pheasant population, but near Estherville, where the impact of the storm was more severe, losses were higher; (2) it appeared that the mortality of pheasants resulted from the sudden exposure of birds unaccustomed to a weather condition of mid-winter severity, and that the amount of mortality seemed closely related to the depth of snowfall and high wind velocity of which the latter was felt to have been of most consequence; (3) species other than pheasants which were found killed by the storm of November 11 were: Red-wings, Meadowlarks, Slate-colored Juncos, Tree Sparrows, Coots, domestic pigeons, cottontails, and a white-footed mouse; (4) birds and mammals killed by the storm constituted an important food-windfall to certain meat-eating species, a matter of considerable importance to the food habits investigator." Bibliography of 5 titles.

Destruction: Highway mortality

Hammond, Merrill C. Fall and winter mortality among Hungarian partridges in Bottineau and McHenry counties, North Dakota, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 375-382, 1 pl., 1 fig., 5 tables.

Author's abstract: "Fall and winter covey counts of Hungarian partridges (Perdix perdix) taken during 1938-39 and 1940-41 disclosed a loss of 23.2% and 30.1%, respectively, between brood season and February average covey sizes. Brood sizes averaged 1.25 birds per covey smaller in 1940 than in 1938, possibly due partly to greater rainfall during the summer of 1940. Highway mortality was found to be .93 and .92 birds per covey in 1938-39 and 1940-41, the loss being principally attributable to collision with automobiles, but partly to injuries caused by flight against elevated wires. The average size of fed coveys was not consistently larger than that of coveys subsisting on natural foods and waste grains, and it is believed that, in the area studied, winter feeding of partridges is not necessary to insure high winter survival under ordinary conditions. Development of natural food and cover and protection from nest predators are recommended for improving local partridge ranges."

Diseases and Parasites: Acanthocephala, Moniliformis

Chandler, Asa C. The specific status of Moniliformis (Acanthocephala) of Texas rats, and a review of the species of this genus in the western hemisphere, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(3), June 1941, pp. 241-244.

Discussion of characters, and review of the described species of which 4 are accepted for the western hemisphere. M. clarki infests Sciurus, Citellus, and Scalopus in mid-western States, and M. dubius, Rattus of the world. Bibliography of 14 titles.

Diseases and Parasites: Acarina, Boophilus

Travis, Bernard V. Examinations of wild animals for the cattle tick Boophilus annulatus microplus (Can.) in Florida, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 465-467, 1 table.

Wild birds and animals other than deer do not serve as hosts for cattle fever ticks. Nine kinds of ticks were recovered from hosts of 4 avian, and 9 mammalian, species; their occurrence is tabulated. Lists of mammals and birds upon which no ticks were found also are given. "Of the 22 deer examined (all from Orange County), 4, which were killed in a large cypress swamp, were infested with cattle ticks, the average infestation being 69, with a range from 3 to 182. The 18 deer on which there were no cattle ticks were taken from pine flat woods. This absence of cattle ticks on deer taken from the woods appears to be correlated with a program of ranging cattle over the tick-infested areas and dipping them at regular intervals. In the swampy areas it has not been possible to control ticks with such a cattle-dipping program, because the cattle do not move about freely in the dense swamps frequented by deer."

Diseases and Parasites: Acarina, Ornithodoros

Davis, Gordon E. Ornithodoros parkeri Cooley; observations on the biology of this tick, Journ. Parasitology, Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 425-433, 6 tables.

Six species of mammals and the burrowing owl are noted as hosts; the known distribution includes 8 western States. Author's summary: "Data on the distribution, type areas, habitats, and natural and experimental hosts of the argasid tick, Ornithodoros parkeri, are given and observations on feeding habits, coxal fluid, longevity, copulation, molting, oviposition, cannibalism and its relation to relapsing fever, Rocky Mountain spotted fever, American Q fever and tularaemia are presented." Bibliography of 8 titles.

Diseases and Parasites: Acarina, Ornithodoros

McIver, Barbara C. A new species of Ornithodoros tick from Nevada (Acarina: Ixodoidea), Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 435-436, 1 pl.

O. cooleyi; no host mentioned.

Diseases and Parasites: Acarina, ticks of Ohio

Katz, Julius S. A collection of Ohio ticks and their hosts, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 467-468, 1 table.

Five species of ticks from 7 mammalian, and 3 avian, hosts; counties and dates recorded.

Diseases and Parasites: Blood parasites

Wetmore, Psyche W. Blood parasites of birds of the District of Columbia and Patuxent Research Refuge vicinity, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(5), Oct. 1941, pp. 379-393, 2 tables.

They were found in 30 percent of 618 birds examined. Four named genera besides plasmodia and microfilaria were represented. The occurrence of each is summarized and measurements and details of occurrence tabulated. Bibliography of 15 titles.

Diseases and Parasites: Botulism

Mays, Alfred S. Observations on duck disease at Tulare Lake Basin, 1940, California Fish and Game (Terminal Island, Calif.), 27(3), July 1941, pp. 154-163, figs. 38-45.

Description of conditions at Tulare Lake that are favorable to the development of Clostridium botulinum, type C, of symptoms of the malady, and of control measures that were adopted. Of 5,437 waterfowl treated in 1940,

4,152 recovered. Popular fancies as to the cause of duck sickness are commented upon and suggestions made for further research.

Diseases and Parasites: Brucellosis

Katz, Julius S. Brucellosis in wildlife, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 99(772), July 1941, pp. 24-27.

Abstract of the literature, 20 titles being cited. The bison, elk, moose, brown rat, pheasant, and turkey are definitely susceptible to the disease.

Diseases and Parasites: Encephalomyelitis

Cox, Herald R., W. L. Jellison, and L. E. Hughes. Isolation of western equine encephalomyelitis virus from a naturally infected prairie chicken, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 56(39), Sept. 26, 1941, pp. 1905-1906.

Rugby, North Dakota, where a human epidemic was in progress. Notes on the tests made and references to previous isolations of the virus from birds.

Diseases and Parasites: Lymphadenitis

Cheatum, E. L. Lymphadenitis in New York cottontails, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 304-308, 1 pl., 1 table.

Author's abstract: "An infection of the lymph system is described and the distribution of necrotic foci tabulated. Stages of infection varied from involvement of a single mandibular node to heavy swelling and necrosis of mandibular, axillary, and lumbar nodes, with occasional metastasis to the heart, lungs, and spleen. The causative organisms identified as a strain of Staphylococcus aureus. Skin injuries were probable avenues of infection and the possibility of ticks being involved is noted. In one locality incidence of the disease was 16.6%; it is apparently highest during late winter and early spring. To date field and laboratory experience does not indicate intrinsic fatality to cottontails but since moribund rabbits are probably inaccessible to the collector, it is difficult to appraise the disease as a mortality factor in the wild."

Diseases and Parasites: Lymphadenitis

Seghetti, Lee, and Frank D. McKenney. Caseous lymphadenitis of deer (Odocoileus hemionus) in Washington, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 98(767), Feb. 1941, pp. 129-131.

Confusion as to this malady; description of lesions; laboratory studies. Apparently the disease is a common one of deer in the Pacific Northwest. Authors' summary: "Corynebacterium ovis was isolated from characteristic abscesses in four deer (Odocoileus hemionus). The etiology of the organism is identical with that of the organism that causes caseous lymphadenitis in sheep. A cultural study of this organism, with symptoms and lesions produced in experimental animals, is important to differentiate the disease from other suppurative processes."

Diseases and Parasites: Mallophaga, Esthiopterum

Wilson, Francis H. The slender lice of American pigeons and doves with descriptions of two new species, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(3), June 1941, pp. 259-264, 10 figs.

Esthiopterum passerinae n. sp., from the ground dove, Alabama; and E. macrourae n. sp., from the mourning dove, Louisiana; description, illustration; discussion of related species; bibliography of 7 titles.

Diseases and Parasites: Nematoda, Crenosoma

Hobmaier, M. Description and extramammalian life of Crenosoma mephitidis n. sp. (Nematoda) in skunks, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(3), June 1941, pp. 229-232, 1 pl.

Original description, California; illustrations; development of larvae in water; Pacific garter snake an auxiliary host.

Diseases and Parasites: Nematoda, Crenosoma

Hobmaier, M. Newer aspects of the lungworm (Crenosoma) in foxes, Amer. Journ. Veterinary Research (600 S. Michigan Ave., Chicago, Ill. $1.25 a copy), 2(4), July 1941, pp. 352-354.

Reports on the results of experimentally infecting foxes and dogs with C. mephitidis. This species and C. vulpis are very similar, morphologically and biologically; both have snails and slugs as intermediate hosts and slug-eating reptiles (garter snakes) as auxiliary hosts. Effective control requires removals of both of these sources of infection.

Diseases and Parasites: Nematoda, Foleyella

Kotcher, Emil. Studies on the development of frog filariae, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 per section), 34(2), Sept. 1941, Section D, pp. 36-58.

A microfilaria is an embryo in suspended development, that can pass through minute channels and penetrate tissues. The comparative sizes of 11 species of 8 genera are tabulated as well as measurements and the positions of certain structures of 3 species of Foleyella. The life histories of these species are detailed and compared with those reported for other forms. 2-1/2 page bibliography.

Diseases and Parasites: Plague, spread of, in ground squirrels

Evans, F. C., and R. Holdenried. Field study of ground squirrel (Citellus beecheyi) in relation to sylvatic plague, Proc. Soc. for Experimental Biol. and Medicine (Utica, N. Y. $1.00 a copy), 47(1), May 1941, pp. 63-64, 1 fig.

California. Notes on growth of young and cruising radius of the squirrels. Ninety percent were never caught outside of ranges 300 yards in diameter and 70 percent remained within areas of not more than 100 yards in diameter; greatest distance moved, 1,300 yards. Changes in numbers are described and graphed; there was a steady reduction in both young and adults from the peak populations of early summer. In October more than 80 percent were young of the year. In view of the essentially sedentary character of the animals, the authors conclude that the spread of plague has been by contact between individuals in a continuous population.

Diseases and Parasites: Protozoa, Eimeria

Waller, E. F., and B. B. Morgan. The pathology of Eimeria leporis (Coccidia) in the cottontail rabbit, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 per section), 34(2), Sept. 1941, Section C, pp. 83-85, 3 figs.

This parasite first described from Lepus timidus in Holland is recorded from Wisconsin, and the lesions caused by it described and illustrated.

Diseases and Parasites: Protozoa, Haemoproteus

Roudabush, Robert L. Gametogenesis of Haemoproteus beckeri in the blood of the brown thrasher (Toxostoma rufum), Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 per section), 34(2), Sept. 1941, Section C, pp. 126-127.

Example of gametogenesis and zygote formation in a vertebrate host of this parasite. Iowa.

Diseases and Parasites: Protozoa, Hexamita

McNeil, E., W. R. Hinshaw, and C. A. Kofoid. Hexamita meleagridis sp. nov. from the turkey, Amer. Journ. Hygiene (Prince and Lemon Sts., Lancaster, Pa. $1.00 per section), 34(2), Sept. 1941, Section C, pp. 71-82, 2 figs.

Review of the occurrence of the genus in various vertebrates and of publications upon them (4-page bibliography); check-list of the species and their hosts; original description and illustration of the form named; account of cross-infection experiments; the organism causes severe catarrhal enteritis.

Diseases and Parasites: Protozoa, Sarcosporidia

Beaudette, F. R. Sarcosporidiosis in a black duck, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 99(772), July 1941, pp. 52-53.

List of 20 species of wild birds in which this parasitism has been reported. It is probably very widespread.

Diseases and Parasites: Protozoa, Toxoplasma

Manwell, Reginald D. Avian toxoplasmosis with invasion of the erythrocytes, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 27(3), June 1941, pp. 245-251, 1 pl.

Review of information about the genus and account of an infection observed in a young English sparrow. Bibliography of 10 titles.

Diseases and Parasites: Protozoa, Trichomonas

Stabler, Robert M. Further studies in trichomoniasis in birds, Auk (Rudyerd Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 58(4), Oct. 1941, pp. 558-562, 1 table.

Rock doves, essentially wild, exhibited a high rate of infection; two nestling duck hawks were found naturally infected; and individuals of several species proved readily susceptible to Trichomonas gallinae. The results of examination of numerous other birds (listed) were negative.

Diseases and Parasites: Trematoda, Cathaemasia

Zeliff, C. Courson. Observations on Cathaemasia reticulata, a trematode from the belted kingfisher, Amer. Naturalist (Science Press, Lancaster, Pa. $1.00 a copy), 75(760), Sept.-Oct. 1941, pp. 508-512, 2 figs., 1 table.

Pennsylvania. Comparison with previous descriptions; synonymy; notes on related forms; illustrations. Bibliography of 6 titles.

Diseases and Parasites: Trematoda, Prosthogonimus

Macy, Ralph W. Further studies on Prosthogonimus macrorchis, oviduct fluke of poultry, with special reference to the effect on egg production in the ring-necked pheasant, Proc. Minnesota Acad. Sci. (H. K. Wilson, Sec'y.-Treas., University Farm, St. Paul, Minn.), 8, 1940, pp. 39-41, 1 fig.

Review of pertinent literature (11 titles cited). Report on experimental work, the findings of which are the reverse of those reported by Gower (see WILDLIFE REVIEW, No. 26, Feb. 1940, p. 13). This author concludes, "that ring-necked pheasants are fully as susceptible to infection with Prosthogonimu

macrorchis as the chicken, and that egg laying is greatly reduced by the presence of this parasite in the oviduct."

Diseases and Parasites: Ulcerative enteritis

Bass, C. C. Quail disease--some of the important facts about it, Louisiana Conservation Review (La. Dept. of Conservation, 126 Civil Courts Bldg., New Orleans), Summer 1941, pp. 11-14, 4 photos (one a portrait of the author.

Ulcerative enteritis or quail disease causes greater losses of quail in captivity than does any other malady. Directions are given for dissecting specimens and recognizing the lesions (figured). Symptoms are described but they are not especially characteristic of this disease. Birds infected either experimentally or by contact with diseased follows die at periods varying from 36 hours to several weeks. Recovery is rare. The causative organism is a "Gram-negative, anaerobic, nonspore bearing bacillus," and vaccine made from it immunizes quail to otherwise infectious doses of living cultures. Quarantining new stock, using half-inch wire mesh for cage floors, and feeding and watering from containers outside of the pens are recommended as preventive measures.

Diseases and Parasites: Ulcerative enteritis

Durant, A. J., and E. R. Doll. Ulcerative enteritis in quail, Missouri Agr. Expt. Sta. (Columbia, Mo.) Research Bul. 325, 27 pp., 7 figs., 2 tables, 1941.

The disease has been reported in the bob-white and in the California, mountain, and Gambel's quails, in chukar and Hungarian partridges, the sharp-tailed grouse, the wild turkey, and domestic fowl. It is highly infective and destructive. This bulletin reviews the literature (of which 13 titles are cited), describes materials and methods of the authors' study, the symptoms, gross- and histo-pathology, and bacteriology of the malady, reports experiments in transmitting it to other species, discusses the rate of mortality in quail, and summarizes the results of the investigation. The causative factor was not determined but was suspected to be bacterial.

Diseases and Parasites: Of birds

Quortrup, E. R., and J. E. Shillinger. 3,000 wild bird autopsies on western lake areas, Journ. Amer. Veterinary Med. Assoc. (600 S. Michigan Ave., Chicago, Ill. 75 cents a copy), 99(776), Nov. 1941, pp. 382-387, 4 photos, tables.

Botulism led among identified causes of death with 47.9 percent of the cases; mechanical injury including shot wounds was next, with 18.5 percent. Lesions and seasonal distribution of botulism are discussed and a list of 38 affected species given. Similar reference to lead poisoning includes a list of 15 species of waterfowl victims. Parasites, seldom a primary cause of death, were found in 3.3 percent of the birds examined; they are listed according to

hosts. Sarcosporidiosis, pneumonia, aspergillosis, tuberculosis, and amoebic dysentery also are reported upon.

Ecology: Beaver dam altering stream insect fauna

Sprules, Wm. W. The effect of a beaver dam on the insect fauna of a trout stream, Trans. Amer. Fisheries Society 1940 (Investment Bldg., Washington, D. C. $3.00 for the entire volume), pp. 236-248, 2 figs., 2 tables.

Author's abstract: "A qualitative and quantitative investigation of the distribution of aquatic insects in Mid Creek, Algonquin Park, Ontario, has been carried out during the summer months of the last 3 years. Samples of the population present were obtained by trapping the insects which emerged from 1 square yard of water surface. In the first season the field station described in this report was characterized by a rubble bottom and rapid flow of water. These conditions remained unaltered during the first part of the second season and the insect emergence for this period corresponded closely with that of the previous year. In early July, however, beavers constructed a dam across the stream flooding the riffle section which was under observation. The number of insects emerging immediately decreased as species dependent on a lotic environment were destroyed or forced to migrate. A few species were able to tolerate the new ecological conditions while a numerically small group of species typically found in quiet water entered the area. In the third season the lentic nature of the habitat was continued and the change in the fauna was more complete since the total population approximated that of a slow-flowing, silted stretch of the stream."

Ecology: Census methods, big game

Bach, Roy N. Some remarks concerning the North Dakota big game survey, North Dakota Outdoors (State Fish and Game Dept., Bismarck, N. Dak. 5 cents a copy), 3(12), June 1941, pp. 18-22, 3 photos, 4 maps.

By airplane observation; technique and results; the maps show ranges of white-tailed and mule deer, and antelope as revealed by the survey. In an introductory statement the Editor (Arnold Strand) comments on the defects in other methods and in the results obtained, which are stated for comparison with those of the airplane reconnaisance. The cost was less than 10 cents per square mile for the territory covered.

Ecology: Census methods, deer

Krefting, Laurits W., and Jack B. Fletcher. Notes on the cruising method of censusing white-tailed deer in Oklahoma, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 412-415.

Authors' abstract: "The method employed for censusing white-tailed deer in southeastern Oklahoma was based on the cruising system, first developed by Arnold B. Erickson in St. Croix State Park, Minnesota. Representative

sample areas four square miles in size were chosen and the census lines were run at one-half mile intervals by the two census takers. Two areas were covered in a day, one in the early morning and the other in the late afternoon. A box compass was used to determine course of direction, and pacing to measure distance traversed. The techniques employed to increase the accuracy of the method were choice of proper weather conditions and manner of covering census lines. The best practice was to proceed slowly in 'hunting fashion,' in other words to stalk the deer along the census route just as a hunter might do. The estimate of 3,125 white-tailed deer on 3,500 square miles of range in southeastern Oklahoma for March 1940 is believed to be close to the actual number of the population."

Ecology: Census methods, mammals

Dice, Lee R. Methods for estimating populations of mammals, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 398-407.

Author's abstract: "Counts of the number of wild mammals in a population are usually difficult or impossible to make because the animals are highly mobile, most of them are shy, and many are nocturnal in habit. The estimates of mammalian populations that have been made up to the present time are mostly based on inadequate data and accordingly very few of them are at all accurate. Most of the field methods in use need further refinement and standardization before they will yield satisfactory data in adequate quantity for statistical treatment. For a few kinds of mammals there have been developed indices of abundance that are easier to obtain than are complete censuses, but which for certain practical purposes are nearly as useful."

Ecology: Census methods, valley quail

Glading, Ben. Valley quail census methods and populations at the San Joaquin experimental range, California Fish and Game (Terminal Island, Calif.), 27(2), April 1941, pp. 33-38, figs. 24-26, 1 table.

Description of a method of strip-counting by men on horseback that is suitable for chiefly open country. Three riders can count the birds on 750 acres during an eight-hour day. Sample results are expressed in map, table, and graph.

Ecology: Census methods, water plants

Siegler, Hilbert R. A water plant census technique, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 423-426, 5 figs.

Author's abstract: "Linear and transect counts made by pacing the shore line and the width of plant communities, are used to establish the ratios of abundance of water plants in small lakes and marshes. Four major differences in plant communities or formations are recognized and illustrated. Each type of plant formation requires a slight modification of the linear and

transect counts. On lakes in which the band of vegetation around the shore line is of fairly uniform width, merely pacing along the shore line and counting 'one' every time the plant species under consideration occurs opposite the foot is sufficient. On a lake with irregular growths of vegetation along the shore line, the linear (shore line) count is supplemented by transect counts through the width of the plant formations. Linear and transect counts are made on lakes and marshes in which several species of plants grow uniformly over the entire area. Where sample counts rather than counts over the entire lake are made, these must be of equal length. On marshes or lakes where the general plant growth is interspersed by patches of different species, linear and transect counts are used, but the transects must run through the patches of mixed growth."

Ecology: Cover mapping

Sandoz, O'Reilly, and L. G. Duck. The development and application of a wildlife food and cover classification in Oklahoma, Pittman-Robertson Quarterly (U. S. Fish and Wildlife Service, Washington, D. C.), 1(2), April 1941, pp. 106-119, 3 photos, 1 map, 2 tables.

A generalized ecological map of Woodward County is presented, and the principal plants and animals of the various associations commented upon in descriptive text. "Management of environmental improvement of game habitat is greatly facilitated by the use of such a type map." Recommendations can be made for any specific area and the range suitable for a given species quickly determined.

Ecology: Kaibab Plateau

Rasmussen, D. Irvin. Biotic communities of Kaibab Plateau, Arizona, Ecological Monographs (Duke University, Durham, N. C. $1.50 a copy), 11(3), July 1941, pp. 230-275, 20 figs., 3 tables.

This discussion takes most account of mammals, birds, and woody plants, but deals more or less extensively also with other groups. A general description and history and a map of the area are presented. There is full discussion of the increase and decrease of the Kaibab deer herd, and a section on extirpated and introduced mammals. The general treatment is by ecological associations and there is a summary, a bibliography of 42 titles, and lists of vertebrates and plants, and of a few insects. An excellent paper, throwing a clear light upon one of the most celebrated and aggravated instances of oscillation of a deer population.

Ecology: Overpopulations

Ratcliff, Harold M. Winter range conditions in Rocky Mountain National Park, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 132-139, 3 tables.

Vegetation in the Rocky Mountain National Park in Colorado has steadily declined since 1931. Browse plants are being so heavily utilized by deer and elk that many have been destroyed and others are now threatened. Herbs have been damaged less than woody plants but the number of weeds is increasing. Conifers and aspens show definite browse lines. This over-utilization cannot be allowed to continue if the range is to be saved and restored. Reduction in numbers of the herbivores must occur either by natural or artificial processes. "The gravest need at present is for legal authority to dispose of surplus animals."

Ecology: Populations, bird

Hickey, Joseph J. Audubon Magazine's fifth breeding-bird census, Audubon Magazine (National Audubon Society, 1006 Fifth Ave., New York, N. Y. This section only, 20 cents a copy), 43(5), Sept.-Oct. 1941, Section II, pp. 480-500.

Report on 40 tracts, averaging 38 acres in size, well distributed over the U. S., and representing very diverse habitats. Data for these areas cover from 1 to 4 years, list the species, show totals of species, and pairs, and density of pairs per 100 acres.

Ecology: Populations, bob-white

Errington, Paul L. An eight-winter study of central Iowa bob-whites, Wilson Bulletin (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 53(2), June 1941, pp. 85-102, 4 tables.

Discussion and tabulation of wintering densities, the usual stability, irregular fluctuation, and the question of periodicity in abundance of bob-white populations; also competition with the ring-necked pheasant. Author's summary: "An eight year (1932-40) field study of central Iowa Bob-white populations not only began and ended with abundance peaks but also covered an interval of pronounced scarcity. Practically all of the traceable mortality associated with the decline took place during the winters of 1934-35 and 1935-36 and most of this proved to be of the familiar starvation-emergency types that may be expected on a greater or less scale nearly any winter; an inexplicably low rate of recovery of Bob-whites among other wild species during the breeding season of 1936, however, may suggest the operation of unknown factors, perhaps of periodic nature. Occupancy of given tracts of environment is evidently determined by the sociality of the birds as well as by food and cover conditions; and this is illustrated by Bob-White responses to crowding either on the part of their own or some other species as the Ring-necked Pheasant, by their occasional late-winter adaptiveness in establishing themselves in food-rich fields away from the bushy fence rows, woodlots, gullies, and water courses usually frequented, and by their apparent maintenance--despite annual changes in habitats and in covey composition--of toleration 'traditions' peculiar to the most regularly used winter territories." Bibliography of 24 titles.

Ecology: Rodent damage

Parker, Lansing A. Factors causing rodent damage to tree plantations in southeastern Minnesota, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 297-303, 5 tables.

Author's abstract: "Tree plantations, for erosion control in southeastern Minnesota, suffered about 47 per cent damage by rodents during the winter of 1938-39. Stem damage, assumed to be caused by mice, affected 36.6 per cent and attacks to the tops, probably by rabbits, 15.3 per cent of the trees. The amount of damage varied only slightly with location and age of the plantations (1-4 years old). Definite species preferences were noted; mice attacked more than 60 per cent of the wild plums, Chinese elms, and soft maples. Rose, hackberry, and green ash were most severely damaged by rabbits. Certain characteristics of the site apparently favored injury. Ideal conditions for mice seemed to be found on areas having a north exposure, formerly in cultivation, with heavy grass cover. Rabbits preferred idle areas with thin vegetation and any slope. The limited data for areas that were furrowed by plowing indicated greater damage to the trees there than on those prepared for planting by hand."

Ecology: Small birds, Arizona

Monson, Gale. The effect of revegetation on the small bird population in Arizona, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 395-397, 1 fig., 1 table.

Author's abstract: "A census of small birds on a controlled grazing area and an adjacent uncontrolled area on the Navajo Indian Reservation revealed more than twice as many birds on the former as on the latter, apparently a result of the increase in cover and food on the former area."

Ecology: Web of life

Hathaway, Edward S. Conservation and the web of life, Louisiana Conservation Review (Dept. of Conservation, 126 Civil Courts Bldg., New Orleans, La.), Spring 1941, pp. 24-26, 2 photos.

Definition of the web of life and discussion of what happens when we tamper with it, illustrated by examples. A rational program in conservation should be based on ecological principles. Bibliography of 6 titles.

Economics: Beaver

McCann, Lester. Beaver as an economic asset, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(12), Sept. 1941, pp. 9-11.

In 1939 the season was open for the first time for forty years. Between 7 and 8 thousand animals were caught. Trapping is described and regulations governing it explained. The value of the catch probably amounts to upwards of $200,000 for the year.

Education: Bird study

Deck, Raymond S. Pageant in the sky. A book of the modern sport of bird-watching (Dodd, Mead & Co., 432 Fourth Ave., New York, N. Y. $3.00 a copy), xiv+268 pp., numerous photographs, 1941.

An interestingly written account of personal experiences with birds by one who is neither all sportsman or all ornithologist, illustrated by photographs of his own taking. Not for the expert or critical ornithologist but it will doubtless convert to bird-watching many a lay reader.

Education: Bird study

Pettingill, Olin S. Bird walks the year around, Biology Briefs (Denoyer-Geppert Co., 1235 Ravenswood Ave., Chicago, Ill.), 4(3), Oct. 1941, pp. 18-20, 3 photos.

Suggestions as to the purpose of bird walks, equipment used, general plans, and what to look for at various seasons.

Education: Conservation

Dahlberg, E. M. Conservation of renewable resources (C. C. Nelson Publishing Co., Appleton, Wisc. $1.00 a copy), ix+217 pp., illus., 1939.

Prepared as a text for schools in Wisconsin, one of the States in which the teaching of conservation is required by law, the book has 5 chapters devoted to animal, 10 to plant, and 1 each to soil, historical, recreational, and human, resources. Author's conclusion: "With the principles of conservation being taught in the public schools it is probable that an ever increasing number of boys and girls will grow up to be champions and defenders of the persecuted and vanishing species of wild plant and animal life. Then the trees and shrubs and wild flowers and the wild animal life of America will soon cease to be objects of perennial pursuit and exploitation, and this western civilization will find a way to substitute a sane and orderly conservation of its natural resources for the prodigal and greedy exploitation that has characterized the past."

Education: Conservation

Elliott, Charles N. Conservation of American Resources (Turner E. Smith & Co., Atlanta, Ga. $1.80 a copy), xi+672 pp., illus., 1940.

The chapter heads are: Steps toward conservation, game birds, game animals, fish, forests, nature's masterpieces, land, water, minerals, animal and plant life, landscape, and planned conservation. Each section of the book

is accompanied by suggestions for study and activities. An appendix includes a glossary of conservation words, a ten-page bibliography, and lists of conservation agencies and organizations. Scattered through the text are messages from 50 leading conservationists (of each of which a portrait is presented).

Education: Conservation

Martin, Charles F., and Lou A. Shepherd. Conservation and the school (Klipto Loose Leaf Co., Mason City, Iowa. 60 cents a copy), 105 pp., illus., 1941.

"The authors' aim is to aid teachers in making conservation a vital part of school living. Certain conservation activities, therefore, are suggested and explained, and the relationships are shown to the commonly arranged school program involving the skill and content subjects. It is hoped by this means to instill democratic living by guiding children to work democratically in groups and to develop respect for land and wildlife through practicing conservation of wildlife which includes conservation of soil." School and community resources, background of conservation of natural resources, and conservation of wildlife as part of school living, are the subjects of the principal chapters. The last is much subdivided and suggests activities for creating, constructing, developing attitudes of service, investigating, appreciating, and developing desirable social attitudes. A characteristic of the book is casting ordinary school tasks in wildlife terms. Three and one-half page bibliography.

Education: Conservation

Onslow, Walton, Charles E. Randall, Howard Zahniser, George Barnes, George Lundy, Shannon Allen, Nash Buckingham, Dave Roberts, Ray Osborne, et al. Conservation education and publicity, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 85-108.

Subjects treated by the speakers included: The conservation activities of the U. S. Department of the Interior, and the ways in which information about them is disseminated; U. S. Forest Service interpretation of the principles of sustained yield, multiple use, and highest use, "for the greatest good to the greatest number of people in the long run"; objectives of publicity in the Fish and Wildlife Service and the necessity of employing personnel of specialized training to carry it on; in the Soil Conservation Service conservation is regarded as a process of use and education about it employs mass communication methods; publicity as handled by the National Wildlife Federation; the preservation, cataloguing, and exchanging of radio scripts; unification of sportsmen's interests and efforts; better training of wildlife writers and use of their opportunities to guide public opinion toward sound conclusions; and conservation education by the states.

Discussion following the arranged program is reported on pp. 108-117.

Food Habits: Browse, white-tailed deer

Dalke, Paul D. The use and availability of the more common winter deer browse plants in the Missouri Ozarks, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 155-160, 5 tables.

Plants of at least 200 species are fed upon by white-tailed deer in this region. Utilization of the more important kinds is discussed and for the winter season, tabulated. The extent of utilization was determined by a clipping study, the results of which are described and summarized in tables for oak-hickory woodland and ravines and roadsides. The yield of browse per acre was also calculated and tabulated. From author's summary: "The deer have nowhere reached populations detrimental to the most palatable woody perennials, forbs, or grasses on the unrestricted range. Various degrees of over-browsing have been demonstrated, however, on one private game preserve. Here exclosure plots are indicating the rate and ability of certain species in recovering from prolonged over-browsing. Greenbrier (Smilax spp.) has demonstrated a remarkable comeback. The greatest amount of browsing upon the stems of woody perennials occurs during the latter part of December, and in January and February. The low-bush blueberry, coralberry, aromatic sumac, New Jersey tea, and greenbrier have proved to be highly palatable throughout the winter. Bluegrass, orchard grass, and several species of panic grasses are heartily utilized. The rosettes of such perennial forbs as the coneflowers and asters are eaten throughout the winter period."

Food Habits: Browse, white-tailed deer

Petrides, George A. Observations on the relative importance of winter deer browse species in central New York, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 416-422, 2 tables.

Author's abstract: "Notes regarding 42 species of woody plants and 2,089 individual browsings upon them by northern white-tailed deer (Odocoileus virginianus borealis) were accumulated on the Connecticut Hill State Game Refuge near Ithaca, New York, during the winters of 1938-39 and 1939-40. Red maple (Acer rubrum), sugar maple (A. saccharum), staghorn sumac (Rhus typhina), and witch-hazel (Hamamelis virginiana) were considered to be of greatest importance, 46.8% of the total browsings recorded being of these species. Large-toothed aspen (Populus grandidentata), quaking aspen (P. tremuloides), birch (Betula), oak (Quercus), round-leaved dogwood (Cornus rugosa), and striped maple (Acer pennsylvanicum) were of 'medium' quality and comprised 30.3% of the total, while eleven species of 'fair' importance and 21 of 'slight' value formed 17.4% and 5.8%, respectively, of the browse noted as consumed. Round-leaved dogwood, staghorn sumac, flowering dogwood (Cornus florida), and basswood (Tilia americana) were the principal preferred species, while red maple, sugar maple, striped maple, witch-hazel, oak, and birch comprised the more important staple foods. The principal emergency foods appeared to be hemlock (Tsuga canadensis), white pine (Pinus strobus), red pine (P. resinosus), Scotch pine (P. sylvestris), and beech (Fagus grandifolia). Of

the total browsing recorded, preferred foods formed 21.8%; staples, 61.1%; emergency, 14.5%; and miscellaneous, 2.6%.

Food Habits: Elk browsing

Gaffney, William S. The effects of winter elk browsing, South Fork of the Flathead River, Montana, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 427-453, 4 pls., 1 fig., 3 tables.

Author's abstract: "A detailed discussion of the environmental conditions on the winter range of an estimated 2,600 elk on the upper South Fork of the Flathead River, Montana. With a summer range of about 420,000 acres, the elk are confined to a winter range of not more than 70,000 acres, of which about 20,000 acres are in a seriously overbrowsed condition. New growth is greatly reduced, and in some instances, almost completely checked on the preferred browse species: willow (Salix), dogwood (Cornus stolonifera), chokecherry (Prunus demissa), serviceberry (Amelanchier alnifolia), mountain maple (Acer glabrum), aspen (Populus tremuloides), and cottonwood (Populus trichocarpa). An increased density of the non-palatable shrubs, such as buffaloberry (Lepargyrea canadensis), cinquefoil (Dasiphora fruticosa), alder buckthorn (Rhamnus alnifolia), and alder (Alnus tenuifolia) is not yet evident, but is anticipated in view of the reduction in volume of the more palatable shrubs. Conifers have been damaged by browsing in some localities. Grass forage has been depleted, but is partly protected by deep snows in the winter. As a result of the overbrowsing, there have already been severe losses in the elk herd, and it is believed that the stock is being degraded through the effects of insufficient winter food. A table lists 78 of the plants on the winter range according to abundance and palatability."

Food Habits: Nutritional analyses

Voris, LeRoy, Lawson F. Marcy, Edward J. Thacker, and Walter W. Wainio. Digestible nutrients of feeding stuffs of the domestic rabbit, Journ. Agr. Research (Supt. of Documents, Washington, D. C. 15 cents a copy), 61(9), Nov. 1940, pp. 673-683, 7 tables.

Analyses of 47 feed stuffs, including some of interest in connection with wildlife management, as alfalfa, Lespedeza sericea, and buckwheat. Bibliography of 8 titles.

Food Habits: Nutritional analyses

Wainio, Walter W., and E. B. Forbes. The chemical composition of forest fruits and nuts from Pennsylvania, Journ. Agr. Research (Supt. of Documents, Washington, D. C. 15 cents a copy), 62(10), May 15, 1941, pp. 627-635, 3 tables.

Percentage analyses of samples of 25 species of fruits and 10 of nuts; discussion of methods and results. Bibliography of 7 titles.

Food Habits: Toxicity of Crotalaria

Nestler, R. B., and W. W. Bailey. The toxicity of Crotalaria spectabilis seeds for quail, Journ. Wildlife Management (Frank C. Edminster (Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 309-313, 3 tables.

Authors' abstract: "The seeds of Crotalaria spectabilis are poisonous to bobwhites. Under ordinary conditions, however, they are not eaten by the birds when there is a choice of feeding stuffs. In fact some individuals starve rather than eat them. If a few seeds of C. spectabilis are picked up accidentally, or otherwise, by the quail, there is a good possibility that they will be evacuated from the bowels undigested, and so do little harm."

Food Habits: Utilization of Caprifoliaceae

Wade, Dorothy R., and Douglas E. Preliminary reports on the flora of Wisconsin. XXVIII. Caprifoliaceae, Trans. Wisc. Acad. Sci. Arts and Letters (Madison), 32, 1940 (1941), pp. 91-101, 18 maps.

Notes on distribution of the various species in the State (also indicated on the maps) and on their value in providing cover and food for wildlife. References to papers of 16 authors on food of wildlife.

Food Habits: Of coyote

Horn, E. E. Some coyote-wildlife relationships, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 283-286.

Arguments for and against coyote control and account of studies of food habits and ecologic relationships of coyotes in California that are still in progress. Author's conclusions: "Study of scats and stomachs from Santa Barbara County, California, showed that deer constituted a large part of the diet of coyotes. Removal of these predators from 160 square miles has been followed by increased survival of fawns, and by a decrease in rabbits and rodents. Coyotes in the foothills of Madera and Fresno Counties feed principally on squirrels and other rodents. Deer are not present. Rodents and rabbits decreased after removal of coyotes, and some species are again increasing. These studies indicate that coyotes play a measurable part in regulating the numbers of deer, but do not control the rodent-rabbit populations. Increased research on specific ecological units is essential to develop management plans that include predator control."

Food Habits: Of coyote

Sperry, Charles C. Food habits of the coyote, U. S. Dept. of the Interior, Wildlife Research Bul. 4 (Supt. of Documents, Washington, D. C. 20 cents a copy), iv+70 pp., 3 pls. (1 col.), 3 figs., tables.

A map indicates the regularly occupied range and sporadic occurrences of the coyote. This comprehensive investigation is based upon examination of more than 8,000 stomachs, adequately representing the range of the animal and the seasons of the year. The results are presented primarily by volume, but also by frequency, percentages. Their distribution by major groups was as follows:

Food item	Percentage of volume	Percentage of frequency of occurrence
Rabbits	33	43
Carrion	25	35
Rodents	18	32
Livestock	13.5	20
Other animal matter	8.5	30
Vegetable matter	2	6

In summary, the taking of 80 percent of the coyote's food is of neutral or of useful, and of 20 percent of harmful, significance to man. It has been customary in economic studies to give approval to species with such a record. This instance shows, however, that the nature of a specific part of the food, even of relatively low percentage, must be carefully analyzed to appraise correctly the relation of the animal's feeding habits to man. As has been pointed out before, percentages do not tell the whole story but interpretation is paramount.

All elements of the coyote's subsistence are carefully discussed, and the paper has a summary, an abstract, and a 4-page bibliography. This satisfactory bulletin is the fruition of a plan for a coyote food habits study for which the Denver sublaboratory was primarily established. The amount of effort that has gone into the collection and examination of material and into preparation of the report is so vast that probably even those who made it can hardly estimate its extent. It gives full confidence, however, in the worth of the findings.

Food Habits: Of deer, white-tailed

Atwood, Earl L. White-tailed deer foods of the United States, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 314-332, 1 fig.

Author's abstract: "A compilation of published and unpublished foods of the following sub-species: Odocoileus v. virginianus, O. v. borealis, O. v. macrourus, and O. couesi. The list includes 516 species from 93 plant families including more than 200 species identified by the author in Missouri and not previously published. General palatabilities are indicated by the relative number of times each species has been recorded."

Food Habits: Of deer, white-tailed

Waugh, Fran. So I began analyzing deer stomachs, South Dakota Conservation Digest (South Dakota Game and Fish Dept., Pierre), June 1941, pp. 7-8, 1 fig.

Notes on food species of Black Hills deer identified in field observation and stomach examination. Leading items were kinnikinnick, tree moss, serviceberry, chokecherry, snowberry, rose hips, juniper, Oregon grape, everlasting, and ceanothus.

Food Habits: Of ducks

Morse, Marius. Duck foods and hunting takes, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(10), July 1941, pp. 34-36.

Notes based on examination of 437 duck gizzards, mostly on the groups of plants that are of little, medium, and much use. The most utilized foods included duckweeds, and the seeds of narrow-leaved, floating-leaved, and bushy pondweeds, bur-reed, and wildrice. There are a few remarks on notable feeding habits of certain species of ducks. Study of the kill on four lakes revealed that the lesser scaup, ringneck, mallard, coot, and teal, in that order, predominate. Hunting hours to bag a duck averaged 1.7; hunting pressure was measured by acreage per hunter, which was 6.2. Crippling losses varied from 9.5 to 19.1 percent, or more.

Food Habits: Of fox, red

Southern, H. N., and J. S. Watson. Summer food of the red fox (Vulpes vulpes) in Great Britain: A preliminary report, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 10(1), May 1941, pp. 1-11, 3 tables.

Analyses of the contents of 40 stomachs from Wales and of 18 scats from mid-England. The commonest food was rabbits; next in order were sheep, small birds, and insects. Lambs are killed by foxes but some of the sheep remains probably represent carrion. In discussion, American findings with regard to the same species are mentioned and of the bibliography of 12 titles, 5 are American papers.

Food Habits: Of grosbeak, evening

Michael, Enid. California evening grosbeak, Yosemite Natur Notes (Yosemite National Park, Calif.), 20(9), Sept. 1941, pp. 86-87, 1 fig.

Feeding on buds of cottonwood and white fir, seeds of elm, and fruits of coffee-berry (doubtless Rhamnus). Four other species also noted as feeding on this fruit.

Food Habits: Of hawk, marsh

[Cook, Fannye A.] Marsh hawks found helpful to farmer, Mississippi Game and Fish (Mississippi Game and Fish Commission, Jackson), 5(6), June 1941, p. 4.

Report on analysis of 56 pellets collected near Clinton, Miss. Thirty contained remains of cotton rats and 10 of rabbits; other contents also are listed.

Food Habits: Of hawks

Jackson, Earl. Don't kill those hawks, National Park Service, Region Three (Santa Fe, N. Mex.) Quarterly, 3(3), July 1941, pp. 25-31, 1 photo, 6 figs.

Chiefly compiled general account of economic values of the hawks and vultures of the United States.

Food Habits: Of mammals, small

Hamilton, W. J., Jr. The food of small forest mammals in eastern United States, Journ. Mammalogy (Emmet T. Hooper, Museum of Zoology, Univ. of Michigan, Ann Arbor. $1.00 a copy), 22(3), Aug. 1941, pp. 250-263, 4 tables.

From his unsurpassed experience, the author comments on methods of studying the food of small mammals. The contents of stomachs, check pouches, and caches provide most of the reliable data. Hamilton says, "I have little faith in the value of feeding experiments on captive animals in determining food predilections." The groups reported upon include the hairy-tailed mole, long-tailed shrews, short-tailed shrew (460 stomachs), deer mice (566), red-backed mouse, lemming mouse, and woodland jumping mouse. The economic significance of the feeding habits of small forest mammals is discussed. Bibliography of 29 titles.

Food Habits: Of osprey

Evenson, Millard C. An osprey catch, U. S. Forest Service (Missoula, Mont.) Northern Region News, June 6, 1941, p. 29 (mimeographed).

An osprey had on a gravel bar a trout it was evidently unable to fly with; it weighed 2-1/2 pounds.

Food Habits: Of owl, barn

Trembley, F. J., and G. R. L. Gaughran. Pennsylvania barn owl survey, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 12(6), Sept. 1941, pp. 6-7, 28, 5 photos.

Report on the food items represented in pellets (number not stated) from Northampton County; as usual, mice were highly predominant. Notes on the visual acuity of a captive barn owl.

Food Habits: Of owl, great horned

Haecker, F. W. Nesting of the great horned owl in Douglas County, Nebraska Bird Review (F. W. Haecker, 506 South 52nd St., Omaha, Nebr. 50 cents a copy), 9(1), Jan.-June 1941, pp. 8-11.

History of a nesting with notes on food, chiefly rabbits, but including also Norway rat, white-footed mouse, and pocket gopher.

Food Habits: Of oyster-catcher, black

Webster, J. Dan. Feeding habits of the black oyster-catcher, Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 43(4), July-Aug. 1941, pp. 175-180, tables.

Identifications of 8 species of mollusks by their shells scattered where young birds had been fed by their parents; analyses of 12 stomach contents (limpets, mussels, barnacles, Nereis); notes on feeding methods and powers of digestion; estimate of the bulk composition of the annual food of the bird. Also data on distribution and migration. Bibliography of 18 titles.

Food Habits: Of pheasant and quail

Wright, T., Jr. A study of the fall food supply of the ring-necked pheasant and the bob-white quail in Washington County, Rhode Island, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 279-296, 6 tables.

Author's abstract: "Sixty-nine quail and 32 pheasant crops were examined. Percentages of the food items were computed by a modification of the dry-weight method. In this the average weight of each item was determined and multiplied by the total number found. The total dry weight of each item was then used in computing the percentages. The relative nutritive values of the principal plant foods were determined by analysis for protein, fat, carbohydrates, ash, and moisture. Forty-four items, representing 35 plant, and 9 animal, species were identified. Bayberries and grass leaves occurred most frequently. Corn, skunk cabbage seeds, rose hips, and cherry stones were found in more than 20 per cent of the crops. On the basis of weight percentages, the pheasant food consisted of 36.85 per cent cultivated grains, 42.01 per cent woody plants, 16.99 per cent miscellaneous plants, with skunk cabbage the most prominent, and 0.72 per cent and 3.38 per cent weed seeds and animal matter, respectively. Fifty items, representing 42 plant, and 8 animal, species, were found in the quail crops. Ragweed, bayberry, and snapweed fruits occurred most frequently. Weed seeds formed 48.6 per cent of the diet, while products of plants of miscellaneous origin and of woody species made up 22.23 per cent and 19.59 per cent, respectively. Cultivated grains and animal matter made up 7.86 and 1.45 per cent. In general, the foods from woody plants including bayberry, poison ivy, arrowwood, etc., have a relatively low protein and nitrogen-free extract content with high fat and crude fiber. Weed seeds have a high fat and protein content with a varying nitrogen-free extract. Skunk cabbage and snapweed seeds have very high protein and fat levels indicating high nutritive values."

Food Habits: Of porcupine

Curtis, James D. The silvicultural significance of the porcupine, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 39(7), July 1941, pp. 583-594, 4 photos, 5 tables.

Review of literature of which 13 titles are cited. Report on the author's investigations on Mt. Toby Forest, Massachusetts. He points out that porcupine work may be beneficial as well as injurious to the forest. Incorrect interpretation and exaggeration have, in the author's opinion, been largely responsible for prejudice against the porcupine. In text and tables, the kinds of trees and the parts attacked, the percentage of trees in the stand damaged, and a comparison of beneficial and injurious feedings, are recorded. Damage to the Mt. Toby stand was not serious because the forest greatly needs thinning. Damage is difficult to appraise. It may sometimes be counteracted by modification of the silviculture. Preventive methods are suggested. "Although artificial control may be justified in some instances, it is expensive." Further research is needed.

Food Habits: Of prairie chicken

Hamerstrom, F. N. Jr., Frank Hopkins, and Anton J. Rinzel. An experimental study of browse as a winter diet for prairie chickens, Wilson Bulletin (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 53(3), Sept. 1941, pp. 185-195, 2 figs.

Abstract by senior author: "Thirty-eight wild-trapped Prairie Chickens (Tympanuchus cupido americanus) were used in experiments during parts of two winters. Buds and catkins of the six most commonly used (in Wisconsin) browse plants, plus five others and two wild fruits, made up the browse diet; controls ate the same foods plus seven cultivated grains; one lot was fed first on grains alone, then on browse alone. For comparison of results, several different time periods have been converted to uniform periods of two weeks each: the birds on browse alone lost an average of 12.9 percent of body weight, and three starved to death; addition of grains caused a recovery of 7.6 percent in weight; birds on grains alone and browse plus grains lost only 1.5 percent and 0.6 percent, respectively. Considering also the food habits and distribution of wild Prairie Chickens, it is suggested that small numbers may be able to supplement a browse diet with an uncertain supply of weed seeds, but that winter grains are necessary to have Prairie Chickens in numbers in the north central states."

Food Habits: Of rook

Collinge, Walter E. The rook as a friend or foe of agriculture, North Western Naturalist (T. Buncle & Co. Ltd., Market Place, Arbroath, Scotland. 2 shillings a copy), 16, 1941, pp. 7-8.

Review of 7 reports on the economic status of the rook, bibliographic citations to which are given. "Summarising the whole of the figures, we find that 52 per cent of the Rook's food constitutes an injury to agriculture and 28.5 per cent is beneficial, the remainder is of a neutral nature. These figures, however, require interpretating, for, as McAtee, Ritchie and others have pointed out, such figures do not indicate an economic equality, particularly where the numerical method is employed. Where the percentage by bulk or volumetric system has been used, we can at once see that if the countless thousands of insects destroyed in the above-mentioned 28.5 per cent had lived

and propagated, the cultivation of cereals, roots, etc., would have been almost impossible." The rock population varies and when overabundant may need to be repressed. "Repressive measures do not involve reckless and wanton destruction; any such unguided policy would, in all probability, lead to very serious and disastrous results. A systematic taking of the eggs or destruction of the nests in districts where the birds are too numerous would probably be sufficient, but the time for this has not yet arrived."

Food Habits: Of skunk, spotted

Crabb, Wilfred D. Civets are rat killers, Farm Science Reporter (Iowa Agr. Expt. Sta., Ames), January 1941, pp. 12-13, 4 photos.

Little spotted skunks in Iowa feed freely upon rats, mice, and cottontails and but little upon poultry. Their protection about granaries is recommended.

Food Habits: Of snakes, garter

Fitch, Henry S. The feeding habits of California garter snakes, California Fish and Game (Terminal Island, Calif.), 27(2), April 1941, pp. 2-32, figs. 22-23, 1 table.

Notes on the general habits, classification, and distribution of these snakes; key to 12 species and subspecies; account of each of 10 forms that comment upon diagnostic characters, distribution, variation, and habits with special reference to feeding. The notes on food habits are chiefly of field observations. "Some are exclusively terrestrial in their foraging, and others are almost entirely aquatic and hence use a different sort of food. Some may conflict with man's interest by preying upon trout and other fishes valued as food or game. Other kinds of snakes, though closely related to these potentially harmful kinds, are almost entirely beneficial in their economic bearing, since they prey upon animals which are detrimental to man's interest--vegetation-destroying slugs. Still others have no obvious economic importance, as they prey upon animals which are largely neutral and have neither direct value to man nor harmful habits--various small lizards, frogs, salamanders, worms and leeches." Bibliography of 17 titles.

Food Habits: Of waxwing, cedar

Goodrich, Arthur L. Waxwings gorge upon apple blossoms, Oologist (Albion, N. Y.), 53(9), Sept. 1941, pp. 106-107.

Manhattan, Kansas; careful and well-described observation.

Food Habits: Of wood rat, white-throated

Spencer, Donald A., and Alice L. Spencer. Food habits of the white-throated wood rat in Arizona, Journ. Mammalogy (Emmet T. Hooper, Museum of Zoology, Univ. of Michigan, Ann Arbor. $1.00 a copy), 22(3), Aug. 1941, pp. 280-284.

More than a thousand dens were opened to learn the character of the wood rat's food and experiments performed to determine the quantity (60% of the animal's weight in cactus daily). Cactus is first in importance, both joints and fruits being taken. The wood rat plays but a minor role in the spread of cactus seeds and in its feeding upon the joints is a check rather than an aid to distribution of the plants. Next to cactus, green leaves, and after those, fruits of shrubs are the foods most commonly stored in dens. Details are given. While grasses were freely eaten by captive animals, none were found stored; they are, however, much used as nest material. Data thus far collected do not indicate undue pressure on range grasses.

Life Histories: Bat, Free-tailed

Brodrick, Harold J. Millions of bats, National Park Service, Region Three (Santa Fe, N. Mex.) Quarterly, 3(3), July 1941, pp. 2-6, 2 photos.

General remarks on bats, and more specific notes on Tadarida mexicana at Carlsbad Caverns and vicinity. More than 100,000 tons of guano are said to have been sold formerly at prices as high as $60 to $90 a ton. Flights of the species once estimated to comprise 3 to 5 million individuals are now seen only in hundreds of thousands. Horned owls observed to catch a few.

Life Histories: Bison

Soper, J. Dewey. History, range, and home life of the northern bison, Ecological Monographs (Duke University, Durham, N. C. $1.50 a copy), 11(4), Oct. 1941, pp. 347-412, 19 figs.

A comprehensive article summarizing all that has been written, and all learned by the author and associates about the bisons of Wood Buffalo Park, Canada. Appearance, range, and abundance of the animals are commented upon; the environment and its weather phenomena described, and all phases of the life history of the bison discussed. Hints are given as to detection and census methods and as to travel at all seasons in the northern wilderness. There is an extensive bibliography. Few American mammals have been written about so extensively and so well.

Life Histories: Blackbird, Yellow-headed

Fautin, Reed W. Incubation studies of the yellow-headed blackbird, Wilson Bulletin (J. Van Tyne, University of Michigan, Ann Arbor. 60 cents a copy), 53(2), June 1941, pp. 107-122, 2 figs., 7 tables.

Author's summary: "The nesting activities of two colonies of Yellow-headed Blackbirds, located in the vicinity of Utah Lake west of Provo, Utah, were studied from April to mid-September. Eighty-three females nested in the Provo River colony and 40 in the Lakeview colony. Egg-laying began May 7 and 61.8 per cent of the females laid their first egg within one day after the completion of the nest. The number of eggs per set varied from 2 to 5, with 4 the most common number (68 per cent). The females were not assisted by the

males in any way in the incubation of the eggs, 56.6 per cent of them beginning incubation at the time the second egg was laid, with a tendency for the beginning of incubation to be delayed longer the larger the clutch. The length of the incubation period varied from 12 to 13 days, 74.6 per cent of the eggs hatching in 12 days. The attentive periods during incubation ranged in length from one to 41 minutes, with an average of 9.1 minutes. These periods were longest during mid-day when the females were seemingly protecting their eggs from the sun. During 83 hours of observation the females spent an average of 63.9 per cent of their time on the nest, with a range from 53.1 to 69 per cent. The inattentive periods ranged in length from one to 18 minutes, with an average of 5.4 minutes. These periods tended to be longest during the morning and evening hours when feeding was most intensive. The hatching success of the larger Provo River colony amounted to 75.7 per cent, while that of the smaller Lakeview colony was only 60.6 per cent, giving an average of 70.9 per cent for the two. Wind and predation were responsible for the destruction of 90 (20.5 per cent) of the eggs before the time of hatching, and 39 (8.8 per cent) failed to hatch because of being addled or infertile. The lesser degree of nesting success of the Lakeview colony was due to a greater amount of predation which in turn may have been the result of a more prolonged nesting season." Bibliography of 18 titles.

Life Histories: Cottontail, Audubon's

Ingles, Lloyd G. Natural history observations on the Audubon cottontail, Journ. Mammalogy (Emmet T. Hooper, Museum of Zoology, Univ. of Michigan, Ann Arbor. $1.00 a copy), 22(3), Aug. 1941, pp. 237-250, 2 pls., 5 figs., 2 tables.

The author describes the methods employed in the study, which was carried on in parts of 5 years near Durham, California. He discusses the findings as to general habits, senses, home range, enemies, escape behavior, parasites, food, breeding, nests, growth, and life span. Range of females is about an acre, of males perhaps as much as 15 acres. Number of young to a litter varies from 1 to 5; breeding occurs throughout the year. The maximum life span is two years or less. Bibliography of 13 titles.

Life Histories: Deer, White-tailed

McBeath, Donald Y. Whitetail traps and tags, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 10(13), Nov. 1941, pp. 6-7, 4 photos, 1 map.

The text tells something of trapping and illustrations show the tagging method. Notes on findings relate to sex ratio (fawns 444:466; adults 1:2 to 1:4) and to homing and wandering radiuses (maxima 20 and 32 miles, respectively).

Life Histories: Dove, Mourning

Moore, George C., and Allen H. Pearson. The mourning dove in Alabama, Alabama Cooperative Wildlife Research Unit (Auburn, Ala.), 36 pp., 3 maps, 4 graphs, and numerous photos, July 1941.

Report on investigations 1935-41 with pertinent general information. Range and characteristics, courtship and mating, nesting habits, development of the young, feeding habits and foods, migrations, and management possibilities are discussed. Adequate protection and maintenance of the supply of preferred foods are the most important measures. Bibliography of 17 titles.

Life Histories: Duck, Ruddy

Low, Jessop B. Nesting of the ruddy duck in Iowa, Auk (Bayard Boulton, Field Museum, Chicago, Ill. $1.00 a copy), 58(4), Oct. 1941, pp. 506-517, Pl. 17, 3 tables.

A 3-year investigation revealed that the most important nesting cover plants were hard-stem bulrush and lake sedge in either pure or mixed stands, growing in 10-12 inches of water. The egg hatch was 71 percent; predation was negligible. The most destructive factor was fluctuation in the water level. Bibliography of 10 titles.

Life Histories: Elk

West, Raymond M. Elk of the northern Rocky Mountain region, U. S. Forest Service (Missoula, Mont.) Field Notes on Wildlife, 2(9), Aug. 1941, 32 pp., 1 map, 1 graph, 4 tables (mimeographed).

Range of the animals, their history in the region, general description, life history, and habits. Size of harems and of herds is discussed and special attention given to feeding habits. A table covering 4 pages records the comparative values of grasses, weeds, shrubs, coniferous trees, lichens, and mosses in the winter diet of elk and deer and also of domestic stock in 3 subregions. Summarizing sections relating to reproduction, the author notes that the numbers of the sexes are about equal at birth, that between 75 and 90 percent of mature females have young, and that twin births are rare. Except for the killing of calves, predation is not a serious drain upon elk numbers. Losses from parasites and diseases (which are listed) is not great. The estimated numbers of elk alive upon the various national forests of the region, and killed during the 1940 hunting season, are tabulated--totals 38,000 and 5,300, respectively. Increase has been almost continuous since 1923. Tables record the numbers and status of both native and planted elk on or adjacent to the national forests of Montana and northern Idaho. The distribution of the animals in native and planted herds and scattered bands is mapped. The report, a compilation from numerous sources, contains many bits of information not mentioned in this abstract.

Life Histories: Fox, Gray

Bailey, Vernon. Gray foxes--all Americans, Nature Magazine (1214 Sixteenth St., N. W., Washington, D. C. 35 cents a copy), 34(9), Nov. 1941, pp. 493-495, 528, 2 photos, 1 map.

Characters, appearance, calls, habits (considerable on food), and list of 21 subspecies, briefly annotated as to color, measurements, and range (the latter also indicated on the map).

Life Histories: Ground squirrels

Scheffer, Theo. H. Ground squirrel studies in the Four-rivers country, Washington, Journ. Mammalogy (Emmet T. Hooper, Museum of Zoology, Univ. of Michigan, Ann Arbor. $1.00 a copy), 22(3), Aug. 1941, pp. 270-279, 2 pls.

An interestingly written account of the life histories of Townsend's and Washington ground squirrels by seasonal periods. A summary of the observations is presented. Average number of fetuses of Townsend's ground squirrel, 8.6, and of the Washington, 8. "Food of these squirrels consists mainly of succulent stems, roots, buds, seeds and pods of bunch grass (Agropyron spicatum), mallow, brome grass, plantain, mustard, and, to a limited extent, of cultivated grains and alfalfa when such crops are near their colony sites. On emerging from hibernation the squirrels greedily nibble the short, green grass or herbage."

Life Histories: Moose

Kellum, Ford. Cusino's captive moose, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 10(7), June 1941, pp. 4-5, 2 photos, 1 table.

Although based on observations upon captive animals, this report is interesting as supplementing scanty information on wild moose. The construction of corrals and feeding racks is described. The animals freely used an old mill pond as a wallow. The kinds of browse and supplements fed are listed. Of more than 200 pounds given daily, a moose consumes from 40 to 50 pounds per day in winter and from 50 to 60 in summer. Information is recorded on weights of the sexes at various ages; maximum about 1,200 pounds. Mating behavior is described. The gestation period is approximately eight months. Notes and measurements are given relative to the growth of antlers. Comment on the keenness of their senses also is included.

Life Histories: Mouse, Field

Hamilton, W. J., Jr. Reproduction of the field mouse, Microtus pennsylvanicus (Ord), Cornell University (Ithaca, N. Y.) Agr. Expt. Sta. Memoir 237, 23 pp., 9 figs., 3 tables, 1941.

This species is "probably the most rapid breeder of all known mammals." The material (including 4,000 specimens) and methods used in the author's study are reported. The reproductive organs of both sexes of the mice are described and illustrated. Discussion proceeds on age of sexual maturity (25-30 days), oestrus and mating behavior, fertility, number of embryos (usually 3-8), parturition, growth of young, number of litters (5-10 annually), mortality of young, life span (10-16 months), climatic factors and the breeding season, and probable cause of winter breeding. Bibliography of 13 titles.

Life Histories: Peccary

Walker, M. V. These little pigs have a way, National Park Service, Region Three (Santa Fe, N. Mex.) Quarterly, 3(3), July 1941, pp. 15-18, 1 photo.

Notes on the musk gland and its uses and certain traits of the animal. Reference cited because of scarcity of information on the javelina, but with the suggestion that the article is definitely teleological.

Life Histories: Pheasant, nesting, Minnesota

Rollings, Clair T. Checking up on the pheasants, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 3(13), Oct. 1941, pp. 41-44, 2 tables.

1,500,000 male pheasants were bagged in 1940, yet the subsequent sex ratio, 1:3, is not considered disproportionate for successful mating. Pheasants waste many eggs in early season depositions; the effective nesting period extends from May 1 to June 15; later efforts are of birds losing their first clutches; some of them result in reduced broods. Of 241 nests studied, 69 or 28.6% were successful, and 172 or 71.4%, unsuccessful. The principal agents of destruction were man, destroying 70 nests (40.6%), predators 40 (23.2%), abandonment, 30 (17.4%), and inclement weather, 24 (13.9%). A table shows the average brood size during 4 periods of the summer.

Life Histories: Pheasant, nesting, Ohio

Strode, Don H. The 1940 pheasant nesting study in Wood County, Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 157, 34 pp., 4 graphs, 1 map, 22 tables (mimeographed).

The annual report on this study; previous installments and other related papers are cited in a bibliography of 16 titles. The methods of the investigation are described and a record form reproduced. Five hundred and thirty-nine nests were found, of which 197 (36.6 percent) were successful. In the four cover types that harbored 97 percent of the nests, losses were about in proportion to total numbers of nests found. Of the nests unsuccessful in all types of cover, 76.6 percent were destroyed by man. Figures are given for nest prevalence and nest losses in various covers, and for clutch-sizes and fertility. Pheasant nesting density decreased with continued use of alfalfa fields: 126.2 to 100 acres the first year; 73.4 the second, and 45.9 the third. The percentage of successful nests also steadily decreased. Night cutting of sweetclover resulted in mortality more than 5 times as great as in day mowing.

Life Histories: Pheasant, nesting, Pennsylvania

Randall, Pierce E. The life equation of the ringneck pheasant in Pennsylvania, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 12(4), July 1941, pp. 6-7, 28-31, 9 figs., 12 tables.

Report on a study conducted on first-class pheasant range in an intensively cultivated tract in Lehigh County in 1938 and 1939. The breeding population was about 1 bird to 8 acres; the sex ratio was 1:7, yet fertility of eggs was 94.1 percent. The history of a population of 950 birds on 1,675 acres is traced through reductions from all causes to a low of 180 and to a new high a year later of 850. Hunting season losses amounted to 650 out of the original stock of 950. The utilization of nesting cover (alfalfa most popular) and the success of nesting attempts are analyzed. Only 25.4 percent of the nests were successful; mowing was the most serious cause of destruction (49.8 percent) and predation second (30.7 percent). Through renesting efforts 52-55 percent of the hens raised broods; juvenile mortality was low (12.4 percent). Bibliography of 21 titles.

Life Histories: Squirrel, Gray

Hungerford, K. E., and N. G. Wilder. Observations on the homing behavior of the gray squirrel (Sciurus carolinensis), Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 458-460.

Authors' summary: "Of 15 gray squirrels trapped from a single feeding location in Storrs, Connecticut, and released along various lines through nearly continuous forest cover, six were recaptured at the original site. Of these, three returned twice. The maximum distance from which squirrels returned was 14,800 feet. This occurred once in less than four weeks, representing the fastest time per unit distance traveled. The largest return was among the first group of squirrels trapped from the area prior to December 11, 1939. This was thought to be due to greater familiarity with the section by the squirrels originally inhabiting territories nearby, and to a lack of snow which during the latter part of the winter served to restrain movement of the animals. Only one female was retrapped, possibly because of the naturally lesser activity of this sex, showed by small mammals."

Life Histories: Tern, Common

Palmer, Ralph H. A behavior study of the common tern (Sterna hirundo hirundo L.), Proc. Boston Soc. Nat. Hist. (234 Berkeley St. Boston, Mass. $1.00 a copy), 42(1), 119 pp., 2 charts, 14 pls., July 1941.

The food habits of the species are reviewed from the literature and also originally noted, as are also relations with other species, parasitic and predatory. The work is not a complete life history but is largely a study of common tern behavior, made according to modern techniques and liberally illustrated by the author by line drawings mostly after photographs. The environment--Sugarloaf Islands, Maine--is described and all activities of the birds observed there detailed, discussed, and summarized. To a high degree the breeding colony acts as a unit. An excellent paper. Bibliography of 9 pages.

Life Histories: Waterfowl

Stoudt, Jerome H. Waterfowl in the Chippewa, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 2(12), Sept. 1941, pp. 20-24.

Chippewa National Forest. Averages of census data for 4 years show the mallard to compose 42%, the blue-winged teal 23%, and the golden-eye 16% of the breeding duck population. Brief accounts of the habits of these three species and of the ring-necked duck (9%) are given.

Management: Attracting birds

Bromley, S. W. Trees and shrubs attractive to birds, Scientific Tree Topics (Bartlett Tree Research Laboratories, Stamford, Conn.), 1(6), 1941, pp. 43-44.

Notes on fruit-bearing species, with a list of 29 kinds of birds seen feeding on mulberries.

Management: Attracting birds

Musselman, T. E. Bluebird housing project, Bluebird (Audubon Society of Missouri, Sullivan, Mo.), 8(11), Nov. 1941, p. 75 (mimeographed).

The author, who has long carried on a campaign to aid bluebirds, states that he has installed 500 boxes for them and in good years has "better than 90% occupancy." To lessen competition by English sparrows and starlings, boxes are not placed near houses or barns. Fence junctions, with some shrubbery, but without vines that will cover the box are preferred sites; the box should be on the outside of the fence and not on the pasture side where it might be rubbed off by cattle, and should touch a barbed wire if one is available. The author (Quincy, Ill.) has distributed leaflets giving plans for bluebird houses and directions for placing them.

Management: Atttracting birds and mammals

Benjamin, J. R. Shell box carpentry, Ohio Conservation Bul. (Division of Conservation and Natural Resources, Columbus, Ohio), 5(10), Oct. 1941, pp. 20, 26, figs.

Illustrated directions for making bird and mammal feeders and shelters. Reprints of the article are available at the address given.

Management: Beaver

Bump, Gardiner. Problems of beaver management in a fish and game program, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 300-306, 1 map.

Beavers, once greatly reduced, increased as a result of protection and plantings and caused many complaints of damage. The State of New York tried control by paid trappers and by allowing complainants to dynamite dams, and shoot or trap the animals under permits. The second method proved more economical and more satisfactory. Experience with both systems is sketched and the injuries and benefits associated with beavers are listed. Author's summary: "To sum up, the successful introduction of beavers into a favorable environment inevitably engenders a host of problems. These arise from, or are affected by, the value of the resultant fur crop, the deep public interest in beavers, the probability that some of the beavers will become a nuisance, the impracticability of handling this problem through continued removal of beavers by state trappers, the necessity of developing more satisfactory methods of control, and the pulling and hauling of divergent interests that are affected variously by an increase in beaver abundance and activities. These matters should be carefully analyzed and their effects weighed before the species is introduced.

"Some one has defined a weed as merely a plant out of place. Even beavers can be in this category unless they are properly managed." Bibliography of 7 titles.

Management: Beaver

Scheffer, Victor B. Management studies of transplanted beavers in the Pacific Northwest, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 320-325, tables.

"There are three important phases in management of the beaver in the Pacific Northwest: (1) Protecting the animal as a producer of fur, (2) removing it from highly cultivated lands, and (3) putting it to work as an agent in soil and water conservation in mountain meadows. In the present stage of land use in the Pacific Northwest, and for some years to come, to manage the beaver as a producer of fur is less important than to use it as a soil and water engineer." In the author's opinion, the open season for public trapping of beavers has had unfortunate results. He believes that trapping should be done only by trained game officers. The results of transplanting operations are summarized in a table. Three-fourths of the liberated colonies disappeared from the planting site in a few days or weeks. Eight principal reasons for this are suggested. The food relations of beaver colonies are discussed under four heads and the principal food trees of the animals are listed. Rates of tree cutting and lodge and dam construction are cited. The average amount of water stored by a colony at the end of the third year was about 15,000 cubic feet. Author's conclusions: "(1) The number of beavers dead-trapped where they are doing damage should be increased; (2) the causes that contribute to the failure of plantings are sufficiently well known that, by careful attention to the selection of sites, the game manager can establish 60 per cent of the colonies released; (3) considering the wide variety of habitats under which beavers are known to thrive, it is not practicable to determine beforehand, by the use of numerical standards only, the carrying capacity of a prospective planting site."

Management: Beaver

Zelinske, Walter. Beaver location, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 6(6), June 1941, pp. 42-44.

Discussion of damage done by flooding areas and cutting trees. In relation to trout the author says, "In some streams that the beaver have dammed the fishing became poorer, in others it became better." In response to complaints, beavers are trapped and moved to favorable habitat where they are not likely to be destructive.

Management: Burning marshes

Lynch, J. J. The place of burning in management of the Gulf Coast wildlife refuges, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 454-457.

Author's abstract: "Fire is a natural factor in the ecology of the Gulf Coast marshes. This study reviews the uses which man has made of fire in handling marsh lands and finds that burning is a most efficient and practical tool in marsh management for cattle, fur, and waterfowl. Marsh fires are classified as cover burns, root burns, and deep peat burns. The functions of burning are: improving habitat, promoting food production, increasing availability of food, protecting the marshes from uncontrolled fire, and facilitating trapping."

Management: Deer, White-tailed

McCain, Randal. Removing surplus deer by hunting, Allegheny National Forest, Pennsylvania, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 332-338, 2 figs., 1 table.

From the stage of almost complete extermination, Pennsylvania deer, aided by introductions, protective laws, refuges, and excellent environmental conditions, so increased as locally to threaten destruction of their forage supply. The Allegheny Forest was one of the badly affected areas. Public sentiment had to be changed before effective steps could be taken to decrease the herds. Finally the killing of antlerless deer was authorized for a 3-day season in 1935 and for 6 days in 1938. The table shows the seasons allowed, estimated numbers of hunters of deer (both antlered and antlerless) from 1931-40 inclusive. "The legal take of 24,000 antlerless deer x x x 1938 was even larger than the total that most sportsmen had been willing to admit existed in the area, yet nearly two animals remained for each one killed." The progress of the herd and the customs of hunters are discussed (illustrated by graphs) and the following conclusions drawn: "Special seasons create concentration of hunting, resulting in accident hazards, excessive illegal kill, and considerable public dissatisfaction. The deer range is now badly depleted; the animals are concentrated in a few drainages and despite losses aside from the legal kill of more than 80,000 head in the past seven years, a surplus still

exists. We have every reason to believe, however, that cooperative effort will soon see this herd put on a sustained yield basis, wherein a balance is maintained between numbers and the forage supply." Bibliography of 10 titles.

Management: Duck food plants

Bellrose, Frank C. Duck food plants of the Illinois River valley, Illinois Natural History Survey (Urbana), Bul. 21(3), Aug. 1941, pp. 235-280, 35 figs., 11 tables.

The hydrography of the river and especially its fluctuating water levels are described in their relation to aquatic plants. Several maps show the distribution of the plants in different types of environment. The important duck food plants, competition between them, methods of control of undesirable, and of propagation of desirable, species, and management procedures are discussed. The publication has various points of novelty, is well illustrated, and informative. From the 26 paragraphs of summary a few are quoted: "A comprehensive survey of plant species in 1938, 1939 and 1940 in more than 20 lakes in the Illinois River valley revealed that sago and longleaf pondweeds, coontail and marsh smartweeds predominated at lakes with stable water levels. River bulrush, American lotus and coontail topped the list in semi-stable lakes. In lakes with fluctuating waters, only river bulrush and American lotus were abundant. In 1936, 1937 and 1940, however, moist-soil plants--such as millets, smartweeds, nutgrasses and water hemp--were very abundant on the mud flats about certain lakes of this last class. Rice cut-grass, coontail, marsh smartweed and longleaf pondweed were the best duck food plants in the Illinois River valley in 1938, when moist-soil plants were wanting. Wild and Japanese millets, pigweed, nutgrasses and nodding smartweed were among the top-ranking foods in 1939 and 1940. American lotus, river bulrush, buttonbush and willow furnish little or no duck food, and are undesirable in many waterfowl feeding grounds, since they compete with more valuable duck food plants. Only fair and temporary benefits have thus far resulted from thousands of dollars spent by duck clubs on waterfowl food plantings. Aquatic and moist-soil plants generally appear naturally in areas when suitable environmental conditions occur."

An appendix listing the waterfowl food plants of the Illinois River valley includes numerous local names.

Management: Farm game

Clark, Arthur L. An indirect approach to wildlife conservation, Pittman-Robertson Quarterly (U. S. Fish and Wildlife Service, Washington, D. C.), 1(2), April 1941, pp. 99-105, 2 photos.

The objectives of the Federal Aid to Wildlife Restoration program, and the fundamental assumptions upon which it is based are defined. Principles and progress are reported. To the reviewer, this paper gives a marked impression of common sense as in the following paragraph: "The studies of the Federal Aid Program in Missouri to date suggest that under present conditions an approach that concerns itself with the conservation and restoration of the

whole biota and recognizes the landowner as the key to the entire problem may be the most effective. In this approach, the conservation and restoration of soil, accomplished by wise use of his land appeals to the farmer because it affects his personal income and advantages. And, in a larger sense, this approach affects all human activities. Agencies which deal with the conservation of natural resources and which fully recognize the farmer, approach the problem from the point of view of the farmer's major interests. Hence, any projects suggested must first provide for major needs of the farmer, the farm family, and the farm community, which are as follows: (1) More productive land. This furnishes the necessities of life and may lead to additional comforts and advantages; (2) more attractive farm life. This keeps the farm family together and more contented. The influence extends to the community."

The author illustrates the working of the plan by showing how cooperating agencies enabled a farmer to install a pond and solve among other problems that of getting water for his stock. This assistance induced the farmer to become an active friend of the agencies. "The interests of the farmer, the community, and the sportsmen were served in the order named." In restoration as applied in Missouri, artificial propagation and liberation are resorted to only when unusual exigencies demand. That these are few is shown by the statement that, "The Conservation Commission neither owns nor operates a game farm." The program is concerned only with native game and the amount needed for restocking is becoming less each year. "Once a farm has been stocked and placed under management, it should not need restocking again." "The task of applying wildlife management practices, based on natural methods, to an area as large as the State of Missouri, is in the process of being accomplished within a reasonable period because of the large number of farmers and others who are becoming actively interested in the broader biotic problems involved."

Management: Farm game, productivity

Ruhl, H. D. Carrying capacity of southern Michigan game range, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 126-131.

None of the present most important farm-game species were plentiful in Michigan under primitive conditions, and the ring-necked pheasant, of course, had not yet been introduced. The wildlife population of four sample areas studied by the Game Division during the past five years is discussed and comment made upon the numbers of animals in relation to area and upon the results of hunting. The author's conclusions are: "From these studies it appears that relatively intense agricultural use of the land does not particularly handicap the pheasant, but that such use removes the brush and woodland required by rabbits and squirrels. Marginal farmland, with waste areas containing brush, is Michigan's best rabbit range. These areas also support the oak-hickory woodland that is probably the State's most productive fox squirrel habitat, but their pheasant production is usually low. Submarginal lands too poor for agriculture usually are occupied by black and white oaks. This is a fair to good habitat for fox squirrels, but poor for rabbits and often supports no pheasants at all.

Management: Farm wildlife

Hochbaum, H. W. Agriculture's interest in conservation, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 24-27.

The welfare of wildlife greatly depends on the way we manage the 85 percent of our land that is controlled by agricultural interests. Some of the lands now devoted to farming could well be used for recreational purposes, including hunting. The Texas program of encouraging farmers to enjoy wildlife resources, to make the most of them, and to conserve them, is praised. Zoning operations in several states are returning lands from agriculture to forestry and enhancing opportunities for wildlife conservation. The Extension Service of the Federal Department of Agriculture is encouraging attention to wildlife on farms and the Boys' and Girls' club members it instructs are showing a growing interest in conservation. Cooperation is easier to obtain than coordination but both are required for success in handling wildlife to the best advantage.

Management: Field borders

Davison, Verne E. Wildlife borders--an innovation in farm management, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 390-394, 2 pls., 1 fig.

Author's abstract: "The wildlife border is presented as a means of land management in the new land-use patterns of southeastern agriculture. It is particularly needed between woodland and cropland and is a vegetated strip designed for multiple use for a turn row, erosion control, water disposal, control of trees, and for beauty and wildlife food and cover. The recommended border consists of two parts: A strip of Lespedeza sericea next to the crops and one of shrubby vegetation next to the woods. The herbaceous portion (15 feet wide) must be maintained free of shrubs and the woody portion (20 feet wide), free of trees. The border serves wildlife best for nesting sites, travel lanes, roosting and resting areas, and escape coverts. Emergency food is also provided by Lespedeza sericea and by woody plants such as sumac, honeysuckle, grape, blackberry, dogwood, cedar, wild cherry, and persimmon, although the principal foods are available in the cropland on the one side and the woodland on the other. The wildlife border is acceptable to most farmers because of its simplicity, its easy maintenance, and its multiple values. The importance of this acceptability is stressed as a limiting factor to the use of wildlife management practices in agriculture."

Management: Forest wildlife

Davenport, L. A. Timber vs. wildlife, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 39(8), Aug. 1941, pp. 661-666.

The author writes mostly of matters regarding which he frankly says he is confused and poses, rather than answers, questions. He does, however, cite

the case of Drummond Island, Mich., where big game hunters spend about $30,000 annually. And he states that wildlife habitat has been damaged by tree planting in areas submarginal for forest growth. He wonders whether wildlife management will come into its own only on areas experience demonstrates to be unprofitable for forestry. He speculates that when those lands are allotted, the wildlife manager will have the cooperation of foresters in using fire as a tool in managing it--or does he but dream?

Management: Forest wildlife

Shantz, H. L. Game management. (Address delivered at Salt Lake City, June 1941, presumably obtainable from the Forest Service, Washington, D. C.) 6 pp. (mimeographed), 1941.

Game management is concerned with regulation of habitat and control of animal populations. Range management must be adjusted to ever-varying conditions but should always be conservative, keeping feed use 25 percent below the average production as a necessary margin of safety. Whenever range is deteriorating there is a surplus of herbivores that should be removed. "Choice timberland should not be managed as grazing land or good grazing land as timberland." On many areas, however, multiple use for forestry and livestock and wildlife production is feasible and desirable. Wildlife has the run of all national forest land (about 1 in each 10 acres of the United States), while domestic stock is limited to about half of the total area of these reservations. Refuges on national forests exceed 35,000,000 acres, more than the combined areas of national parks and refuges of the Fish and Wildlife Service. The tendency, however, is to drop absolute protection, in favor of management for use, of wildlife on the forests. Public sentiment having so pronounced an influence upon wildlife protection, there must be a continuous campaign of education to obtain approval for management policies recommended by specialists. Cooperation between all agencies involved is essential and is the goal of the Forest Service.

Management: Fur animals

Ashbrook, Frank G. The position of fur resources in the scheme of wildlife management, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 326-330.

Fur animal conservation may be made to pay for itself with perhaps something left over for other objectives should need arise. The author deprecates the subordination of tangible, to intangible, values in conservation and hails the revenue-yielding record of the Pribilof fur-seal herd as outstanding. Fur animals though benefited by refuges established for other forms of wildlife should have some of their own. "In the not too distant future fur animals may be paying the way for the migratory waterfowl." States should give more attention to fur animal conservation and should afford certain threatened species complete protection. The restoration of beavers after general decline is cited as an example of what fur animal management can do. Last year (1939-40) these animals added $1,250,000 to the national income.

Author's summary: "The principal object of conservation, whether of fur animals or other forms of wildlife is 'Conservation with wise use.' Applying this principle involves a comparison of sporting and commercial values that up to the present time has been largely avoided. However, any conflict of activities between sportsmen, trappers, and fur traders uselessly wastes both time and energy. These groups should work out their problems together and present a united front in urging legislation concerning conservation. The drainage of swamps and lakes not only is inimical to waterfowl, but also does away with the muskrat which could ultimately pay for the lands; forest fires destroy fur animals as well as game; and polluted waters destroy the food of these animals. Where there is laxity in the enforcement of game laws the situation is usually worse with respect to fur animals. At present, when public attention is turning more and more towards conservation and restoration it would seem to be the wise policy to treat fur animals as a valuable resource worthy of cultivation. All of us who are vitally interested in the conservation should insist that fur animals be given favorable consideration in evolving plans or policies for the maintenance and use of our wildlife resources."

Management: Grouse, Prairie

Viehmyer, Glenn. The present status of the greater prairie chicken and sharp-tailed grouse in the Sandhill Region of Nebraska, Nebraska Bird Review (F. W. Haecker, 506 South 52nd St., Omaha, Nebr. 50 cents a copy), 9(1), Jan-June 1941, pp. 1-7.

Review of the status of the birds. Conditions originally favorable deteriorated but have recently improved, especially in the Sandhill Region. Food is as plentiful, if not more abundant, than ever; natural enemies are less; and recent breeding seasons have been favorable. Nesting grounds are the limiting factor, but where grazing control in addition to the necessary ecological conditions prevails, the birds are relatively safe. The author's conclusions are: "(1) That at the present time the Nebraska sandhill region is the only area in the state that has much value as a breeding ground for the Greater Prairie Chicken and the Sharp-tailed Grouse; (2) that unless the present favorable nesting conditions are maintained the sandhills will also lose much of their value in this respect; (3) that while other grazing lands of the state could by proper management be made acceptable as breeding grounds, it is highly improbable that such management will ever be developed; (4) that we now have a sufficient number of breeding birds to restock those parts of the state that are capable of supporting populations of these two species of upland game birds; and (5) that the preservation of these species is dependent upon the establishment and maintenance of suitable nesting areas, and that only through the cooperation of all interested persons and agencies can such breeding grounds be established and maintained."

Management: Harvest

Hicks, Lawrence E. What happens during a game harvest?, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 338-347, 7 figs.

Report on Ohio studies contributory to a management program. Turnover in cottontail populations is practically as rapid on areas closed, as on those open, to hunting. Hunting, while accounting for only a small part of the total mortality, removes from one-fourth to three-fourths of the adult animals. Losses of mature pheasants are 64 percent during the hunting season, 18 in the reproductive period, 12 in winter, and only 6 percent during the remaining 3-1/2 months. Under present hunting conditions, a population of 100 cock pheasants will be reduced to 1 in 27 months and of hens to 1 in 57 months. About 91 percent of the annual mortality of adult cock birds is due to hunting and though illegal, 35 percent of the hens. Crippling losses are about 18 percent. The killing of hens seriously reduces production and "other management measures seem not worth taking until this unnecessary leak is plugged." Hunters are classified and it is shown that 46 percent of them are farmer-landowners. Nearly two-thirds of farm operators participate in the annual game harvest. On account of their sympathetic viewpoint, the larger the proportion of such hunters the more favorable conditions are for non-residents desiring to hunt. Hunting pressures analyzed show marked correlation with the progress of the season and the occurrence of holidays. About 22 percent of the 14-day season's game bird hunting is done on the opening day, 46 percent during the first three days, and only about 6 percent during the last two days. Nearly 55 percent of the season's bag of pheasants is taken during the first three days of the season. Records of a staggered season showed that it resulted in a somewhat larger kill and failed to spread hunting pressures more evenly throughout the open period.

Management: Harvest, deer

Schunke, William H., and Irven O. Buss. Trends in the kill of Wisconsin whitetail bucks, 1936-1940, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 333-336, 1 pl., 1 fig., 7 tables.

Authors' abstract: "Measurements of 452 whitetail bucks were made from 1936 through 1940 and compared from year to year to determine whether or not the deer were decreasing in size and whether their antlers were becoming progressively smaller. Age classes based on beam measurements, number of tines per head, and actual weights were used in making comparisons. The average dressed weight of 108 bucks showed a progressive decrease between 193 and 1940. With the decrease in weight since 1936, there was a corresponding decline in the number of bucks of the older age classes, and in bucks with eight or more tines per head."

Management: Harvest, furs

Hayne, D. W. Michigan trappers, Mich. Agr. Expt. Sta. (East Lansing) Special Bul. 307, 34 pp., 6 figs., 10 tables, 1941.

Sources of information were reports from fur trappers and buyers and a study of farm trapping in Williamston Township, Ingham County. The history of the fur trade in Michigan is reviewed; it was a major income producer up to 1812. Though a minor industry, trapping still yields a million dollars annually in the State. The data available to the author are statistically treat

and discussed in detail. General conclusions are that trapping is largely carried on by rural boys and young men and that their average income from this source was about $20 in a season of low prices. Most trapping is done in the southern more densely populated part of the State. Farm families do most of the trapping and, as landowners, control the future of the fur resources of Michigan. Bibliography of 14 titles.

Management: Harvest, game kill, Wisconsin

Anon. The 1940 game kill, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 6(6), June 1941, pp. 8-11, 8 figs., 1 table.

The kill by species for 1940-41 compared with that of 1939-40, the totals for each season exceeding 4,400,000. Discussion of the trends for various groups.

Management: Harvest, squirrels

Chapman, Floyd B. The 1940 squirrel harvest on ten public hunting preserves in Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus) Release 162, 17 pp., 6 figs., 10 tables (mimeographed), June 1941.

This sixth of a series of reports on controlled squirrel hunting discusses the status of the gray species in relation to variations in food supply and to its own cyclic fluctuations and gives findings for the 1940 season relative to harvest, hunting pressure, sources of hunters, hunter efficiency, arms and ammunition used, crippling losses, weights of gray squirrels, and the gray squirrel-fox squirrel ratio. Bibliography of 28 titles.

Management: Inventory, appraising quail lands

Stoddard, Herbert L., and Ed. V. Komarek. The carrying capacity of southeastern quail lands, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 148-153.

The development of agriculture in the Southeast in relation to quail production is sketched. At present, three unfavorable trends are in evidence: Protection of pine woodlands from fire resulting in dense growth that excludes quail; intensified grazing reducing carrying capacity; and mechanized farming of crops in large blocks producing a monotonous environment. Good quail land is defined as that upon which from 15 to 20 or more coveys can be found with good dogs in a six-hour day. It ordinarily requires about 10,000 acres to produce an average yearly bag of a thousand quail. Some lands are so poor as not to justify intensive management. On the other hand, an average population of one bird per two or three acres over large areas can be maintained at comparatively small cost. To double that population, however, might cost ten times as much. Suggestions are given as to making rough estimates of the number of coveys, which are all that are necessary for practical appraisal of quail lands. Good shooting cannot be economically maintained without soil that is basically fertile and adapted to the growth of native legumes and

other feed." The soil should be well drained; otherwise native food plants d not thrive and standing water may be a hazard to young quail. Carrying capac can be judged by the abundance of certain key legumes and grasses; qualifying factors are commented upon. Brush control is necessary and if no brush-cutti equipment is used, it requires about as long to get a property back into cond tion as it originally took to get it out. Restoration after overgrazing also is a slow process. Protection of nearby areas from fire increases hazards fr predators and means of controlling them must be considered. Interspersion of small fields and open woodlands is desirable, and clean cultivation of large tracts the reverse. Cover that can not be conveniently hunted through decreases the availability of birds and hence the value of the property. The paper is summarized in 8 short paragraphs.

Management: Inventory, carrying capacity

Mitchell, G. E. The determination of carrying capacity on wildlife areas, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 140-148.

"The administrator's job is to produce and maintain the largest number of animals the habitat will support on a permanent basis. His greatest probl is to determine the sustaining carrying capacity of the habitat and hold it t the maximum." Lacking definite information as to the numbers of his charges and having little or no control over their movements, the wildlife manager must keep informed as to carrying capacity by constant appraisal of the condition of the forage plants. The objective is to hold a population that the range will support in good condition without deterioration of the principal forage species. The author describes a key area-key species method of determining range utilization and carrying capacity and discusses its application. The sedentary nature of big game suggests that management should be on a herd basis, each band being studied and controlled separately as the conditions of food, environment, and land use indicate. Any plan of management should be on the safe side so far as the food supply is concerned rather than favor numbers of game animals. Bibliography of 7 titles.

Management: Inventory, deer

Frodine, Gordon. Deer inventory studies in Minnesota, Proc. Minn. Acad. Sci. (U. K. Wilson, Sec'y.-Treas., University Farm, St. Paul, Minn.) 8, 1940, pp. 41-49, 5 tables.

History of deer numbers in the State. Good management requires reliab inventories. This paper reports on counts by the drive method made by adequate personnel. They are reported by regions, distributed by age and sex classes, and summed up in figures for deer per square mile. Author's conclusions: "(1) The deer census work involving the total deer count method on sample areas has revealed that an average population of 13.76 deer per square mile existed in the fall of 1939 over a total of forty-five sample areas comprising fifty-one square miles; (2) annual deer counts reveal a decline of three deer per square mile on the sample areas since 1935; (3) hunting take studies have shown that from one and one-half to two deer per square mile are

removed by hunters during the open hunting season; (4) winter mortality studies in the Superior National Forest show an average loss of eleven deer per square mile of wintering range since 1937 and that this loss, due largely to malnutrition, is in excess of the hunting take; (5) studies on the condition of the deer range indicate that in areas where more than average deer concentrations occur the capacity of the range to support deer is declining; (6) in order to adequately manage the deer herd in Minnesota, efforts must be made to control their abundance within the carrying capacity of the range and to maintain and increase the carrying capacity of the range through environmental control."

Management: Inventory, forage

Schwan, H. E., and Lloyd Swift. Forage inventory methods, with special reference to big game ranges, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 118-125.

The most widely used method is one involving relative densities of vegetation. Its limitations are discussed and weight estimation suggested as an improvement. Instructions are given to its use. Bibliography of 16 titles.

Management: Inventory, hunter activities

Gordon, Seth, Jr. A sampling technique for the determination of hunters' activities and the economics thereof, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 260-278, 7 figs., 6 tables.

Author's abstract: "A method for sampling hunters' activities according to age, and income and occupational groups, was developed and carried on experimentally in one county in Michigan. Personal interviews were completed for about 300 individuals. Replies showed a uniformity when analyzed that is believed to be beyond the possibilities of mere chance. It was computed that resident hunters in the county spent $66,000, had an annual investment in guns of $20,000, and received $15,000 from furs trapped. They spent 94,000 hours hunting, killed 3,900 pheasants and 14,000 rabbits. The survey is believed to be of value from a number of standpoints and more accurate than the usual information received on hunter activities."

Management: Inventory, waterfowl, Minnesota

Smith, Don. Minnesota's waterfowl situation, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 3(14), Nov. 1941, pp. 12-15, 3 tables.

Discussion of weather and especially precipitation in relation to waterfowl. Results of a count by 41 observers on 11 areas. Total number of waterfowl nearly 50,000, of which about 27 percent were coots. On six areas the average number of ducks per mile of shore line was 26.9. In a nesting study, 83 percent of the nests were observed to be successful. Of 22 nests

destroyed or deserted, 41 percent were broken up by striped skunks, 18 percent by crows, and 18 percent by mowing.

Management: Land utilization program

Wickard, Claude R. Wildlife's share in the use of the land, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 12-15.

Wildlife has both economic and spiritual values and is entitled to share in the use of land. Department of Agriculture activities aiding wildlife are instanced from the programs of the Soil Conservation Service, the Agricultural Adjustment Administration, and the Forest Service. Wildlife may also be regarded as a crop and its proper utilization calls for wise planning and good management.

Management: Mallard

Girard, Geo. L. The mallard, its management in western Montana, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(3), July 1941, pp. 233-259, 1 pl., 3 figs., 2 tables.

Author's abstract: "The greater part of the information was obtained in three years' study on the Ninepipe and Pablo Migratory Bird Refuges, areas 2,002 and 2,540 acres, respectively, in Flathead Valley, Lake County, Montana. Management of the mallard is a year-round problem in western Montana and to be on the safe side the nesting season should be considered to extend from March 14 to August 18. Grasses proved to be the most desirable nesting cover and shore lines bordering small bodies of water were preferred. Success in rearing young was greatest on small protected bodies of water. Favorite resting areas were the shore lines of protected bays in smaller, and of peninsulas and islands in larger, areas. In western Montana during eight months out of the year the mallard is primarily dependent upon farm products for food. Aquatic plants are usually not plentiful in the early spring and late fall, and food areas newly flooded in those seasons are very attractive. Under certain conditions, winter feeding was very desirable. Information is given on the following habits, management practices, and characteristics: migration, spring feeding, cover, courtship and mating, honeymoon or rest period, nesting and egg-laying activities, incubation, hatching periods, egg characteristics, predators, resting areas, plumages, family life, survival of young, relationship to certain other nesting species, year-round activities, food and food areas, grit, farming programs, winter feeding, and hunting activities."

Management: Muskrat

Pirnie, Miles D. Muskrats in the duck marsh, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 308-312, 2 photos.

"Proper handling of a muskrat marsh should be aimed at maximum pelt production without serious injury to waterfowl habitats and foods." Control of water levels, removal of surplus and nuisance muskrats, and supplementing the natural food supply, may be necessary. Suggestions are made in each of these respects. Author's conclusion: "Although excellent progress has been made in life-history studies and in a few management techniques, many chances for new management are being overlooked. The control of water levels and managed trapping are the basis for good muskrat-waterfowl management. Special effort should be directed toward the natural restocking of marshes by bottom cultivation, special planting, and muskrat control. Legal protection of muskrats should be no more liberal than the animals require. Excessively short trapping seasons are wasteful and tend to discourage management."

Management: Overpopulations

Barker, Elliott S. Removing surpluses of wildlife from the standpoint of State administration, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 362-367.

Account of the control of surpluses by regulated hunting of mule deer and antelopes; also by transplanting the latter animals. Trapping methods developed in the taking of more than a thousand antelopes are described.

Management: Overpopulations

Cahalane, Victor H. Wildlife surpluses in the national parks, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 355-361.

"The broad purpose of wildlife management in the national parks is to restore and conserve a normal fauna in an entirely unimpaired environment, from which the public may derive inspiration, enjoyment, and educational benefits. Under ordinary circumstances, 'normal' conditions can be maintained only by allowing free action of natural forces. Except in unusual crises, any interference for the benefit of a particular species of animal or plant would almost inevitably react to the detriment of something else, and would mar the perfection of the picture of original conditions that we strive to present. The same result would follow any attempt to stabilize animal populations at a rigidly established level. The effects of natural forces are a desired part of the picture." Hence surpluses must be differently defined in national parks than in hunting ranges; they exist only when there is manifest overpopulation of the range. In migratory species that range may be outside of the park boundaries. If through livestock competition the outside range is depleted, or migration routes are blocked, problems of overpopulation in the park are intensified. These conditions are exemplified by the Yellowstone elk herd of which there is a surplus of about 50 percent. Artificial feeding and predator control also have resulted in surpluses of herbivores. Public feeding has brought on undesirable concentrations of bears, which for the safety of park visitors, must be controlled. Suggested methods of handling surpluses include: acquisition of additional winter range, hunting outside but near the

parks, destruction by officials of dangerous animals, and transfer of specimens desired elsewhere. Authority for more comprehensive procedures is needed.

Management: Overpopulations

DuMont, Philip A., and William Krummes. Removing surpluses from national wildlife refuges, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 348-353, 1 table.

Authors' summary: "Surpluses of resident and confined populations of wildlife are resulting on certain of the national wildlife refuges. The normal diffusion of these animals to surrounding territory frequently is retarded through hunting pressure outside the refuge, through lack of a suitable adjacent habitat, and by fencing. The removal of surpluses has generally been by one of four methods: (1) Live-trapping by state authorities for restocking purposes; (2) public harvesting by trapping on a cooperative or fee-basis; (3) government removal of animals damaging structures or habitat; the reduction of predators; and trapping in connection with experimental projects; (4) disposition of animals from fenced game preserves by gift, exchange, or sale."

Instances of surplus disposals are cited for pheasants and muskrats in South Dakota, white-tailed deer in Texas, Gambel's quail in New Mexico for restocking purposes; skunks in North Dakota by way of predator control; and muskrats in Maryland and bisons in Oklahoma to regulate their populations.

Management: Overpopulations

Shantz, H. L. Responsibilities and limitations in removing game surpluses on national forest areas, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 368-377.

The Forest Service has much responsibility but little authority in dealing with largely State-controlled wildlife. Public sentiment also is an obstacle to herd regulation as it is reluctant to admit that any surplus exists Reduction being opposed, feeding is resorted to with the usual result of increasing the overpopulation. Natural causes of mortality are discussed but hunting is considered the best means of keeping herbivores in balance with the available forage. Usually it is not carried on intensively enough to really control overpopulations. Contributing difficulties are discussed and the statement made that authority is lacking for removal of what can safely be designated a surplus from a biological point of view. There is probably no more danger of losing our deer and elk than of losing our cattle or sheep. Still, neither type of animal should be allowed to destroy the productivity of our lands. Certain marked instances of game overpopulations and their effects in Arizona, Montana, Oregon, California, and Utah are discussed. In some, control has been undertaken, for others, agreement among interested groups is yet to be obtained.

"Economic and social surveys should, like forage surveys, aid in pointing to a reasonable solution of some of these problems. They should not be

solved by pressure groups or by the decision of those little acquainted with conditions but by a consideration of the future welfare of the resource and of the equities involved. The most important factors in the production of a good crop, which we may call a surplus are: (1) A place to live--the land with ample food and cover, and (2) a herd of high-quality breeding animals. In order to insure these requirements the herd must be controlled as to numbers and quality. This control should be by licensed hunters and the crop taken regularly to insure a sustained income to the State, the licensing agency and in such a manner as to afford the best recreational results, the best game animals, and leave a breeding stock of sufficient number and above all of superior quality, within the capacity of the local range. Control of the environment and control of the harvest are the implements of management."

Management: Planting, cuttings

Doran, Wm. L. The propagation of some trees and shrubs by cuttings, Massachusetts Agr. Expt. Sta. (Amherst) Bul. 382, 56 pp., March 1941.

Report on results from different methods of treating cuttings of a large variety of native and introduced species, the index to which occupies more than 9 pages. Bibliography of 130 titles.

Management: Planting, nursery practice

Engstrom, H. E., and J. H. Stoeckeler. Nursery practice for trees and shrubs suitable for planting on the prairie-plains, U. S. Dept. Agriculture Misc. Publ. 434 (Supt. of Documents, Washington, D. C. 25 cents a copy), 159 pp., 53 figs., 26 tables, 1941.

The desirability of tree planting in the prairie-plains region is pointed out and nursery practice discussed under the following heads: Collection and handling of seeds, selection and maintenance of the nursery site, water supply, ground preparation and seed sowing, germination and seedling culture, special methods, nursery inventory, lifting and field grading, winter storage, and shipping of stock, seedling protection, pathology of deciduous seedlings, and costs. Under seedling protection, damage done by mammals and birds is described and methods for controlling it are suggested. There is a bibliography of 54 titles and a reference list of the tree and shrub species treated in the publication. Of the medium to tall deciduous trees and conifers, 37 in all, 14, and of the short trees and shrubs, 28 in all, 14, are extralimital to the region.

Management: Planting for wildlife

Wright, Robert T. More food--more birds, Amer. Field (222 W. Adams St., Chicago, Ill. 20 cents a copy), 136(S3), Aug. 16, 1941, pp. 148-149, 4 photos.

Suggestions as to food and cover plants. The statement that "the game population varies with the food supply" is an unguarded one--cyclic species for instance?

Management: Planting for wildlife, aquatics

Siegler, Hilbert R. Duck food nurseries for lakes and ponds, Texas Game, Fish, and Oyster Commission (Austin), Bul. 22, 8 pp., illus., June 1941.

Suggestion that wet-soil and water plants be tested in small fenced areas on the margins of lakes and ponds to determine which are worthy of more extensive use. The species important in Texas are listed, and hints are given on planting and fertilizing methods. Bibliography of 5 titles.

Management: Planting for wildlife, woody plants

De Franco, J. A. Planting woody plants for food and shelter for wildlife, Rhode Island Agr. Expt. Sta. (Kingston), Misc. Publ. 9, 10 pp. (mimeographed), April 1941.

Chiefly compiled matter on the management of plants variously utilized by wildlife. The planting recommendations are made for vines, ground cover, shrubs of 4 height classes and trees of 2 such groups. The species recommended are briefly annotated.

Management: Planting for wildlife and erosion control, legumes

Graham, Edward H. Legumes for erosion control and wildlife, U. S. Dept. of Agriculture, Misc. Publ. 412 (Supt. of Documents, Washington, D. C. 65 cents a copy bound in buckram), ii+153 pp., 29 pls., 3 tables, 1941.

This excellent and admirably illustrated book presents information on the value of legumes to the soil conservationist and wildlife manager. It discusses man's use of legumes and their role in soil improvement, as weeds and poisonous plants, in erosion control, and as wildlife utilities. A table presenting nutritional analyses of several species is included. Knowledge of wildlife utilization of legumes is "woefully inadequate," but such as it is, it indicates most patronage by rodents, ungulates, and gallinaceous birds. Nearly 100 pages are devoted to an annotated list of legumes, native and cultivated, in which synonymy and occurrence are treated, and appearance, habitat outstanding characteristics, and wildlife utilization noted. There is an index to animals and the legumes they utilize, a list of common names of legumes with their technical equivalents, and a bibliography of 223 titles.

Management: Ponds

Allan, Philip F., and Cecil N. Davis. Ponds for wildlife, U. S. Dept. of Agriculture Farmers' Bul. 1879 (Supt. of Documents, Washington, D. C. 10 cents a copy), 46 pp., 29 figs., tables, July 1941.

Erosion control and other uses of ponds are treated. Suggestions are given for locating, constructing, and fencing ponds and for using vegetation

to minimize erosion hazards, both in the pond itself and on its shores. About a quarter of the pagination is devoted to lists, descriptions, and observations relative to the plants that are recommended, and ten pages to management of wildlife in and about ponds. A timely and useful publication.

Management: Shelterbelts

Orendurff, Carroll F. The first wildlife inventory of Nebraska shelterbelts, Nebraska Bird Review (F. M. Haecker, 506 South 52nd St., Omaha, Nebr. 50 cents a copy), 9(1), Jan.-June 1941, pp. 7-8, 1 table.

The author cites the reasons for shelterbelt plantings and lists the principal species used. Responses to a questionary to bring out the value of the belts to wildlife are tabulated. Evidently they have had a very favorable effect, increases in various groups of farm wildlife being estimated at from 18 to 75 percent. "The consensus of cooperators returning the questionnaire was that the belts had proven of much value to Nebraska wildlife in furnishing protective cover from hunters, predators, and the elements, and in producing nesting facilities and food, and that these values would increase as the age of the belts advanced."

Management: Soil conservation in relation to wildlife

Graham, Edward H. Wildlife management as a part of soil conservation, Soil Conservation Service (Washington, D. C.), Misc. Publ. 23, 50 pp. (mimeographed), June 1941.

The history of soil conservation in this country is traced from the earliest records to the establishment of Soil Conservation Districts in recent years. The growth of the Biology Division with the Soil Conservation Service is described and its functions defined. Soil conservation practices beneficial to wildlife are discussed under 11 heads, the message of the publication is summarized, and a 14-page bibliography presented. A useful work showing the present status of its subject and referring to practically all of the pertinent publications.

Management: Stocking, partridge, Hungarian

Dale, Fred H. "Judgment suspended" on Hungarian partridge projects in Michigan, Michigan Conservation (328 State Office Bldg., Lansing, Mich.), 10(10), Sept. 1941, pp. 6-7, 2 photos, 1 map.

The map shows the locations at which both imported and propagated birds were released and the text gives the history of the species in Michigan. Most releases have been failures, none has been outstandingly successful. The birds first became established by spread from Ohio. Experience indicates that the birds do best on light soils in rolling uplands, and that moderately warm, dry summers are most favorable to their increase. They do best in cover that is not too dense and are well adapted to farming country.

Management: Stocking, raccoon

Steuwer, Frederick W. 'Coon stocking not for Michigan, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 10(8), July 1941, pp. 3, 11, 2 photos.

Ohio experience put the average cost of producing a raccoon in captivity at $6.40. As pelts have sold in recent years for about $3.50, pen rearing is uneconomic as a means of fur production. The cost is too high also to justify release for recreational hunting. If the entire amount of license fees paid by Michigan hunters of raccoons were spent for animals at the rate mentioned, it would purchase only 1,560; there are 10,000 hunters. Stocking is not necessary to recovery of the species in depleted areas as the young disperse widely. The take remains fairly constant (15 to 20 thousands annually) despite variation in length of the open season. The release of a comparatively small number of pen-raised raccoons would have little or no effect on the take. The history of animals released at the Swan Creek Wildlife Experiment Station is cited in support of that conclusion.

Management: Stocking, turkey

Goodrum, Phil D. Capture of wild turkeys in Texas for restocking, Pittman-Robertson Quarterly (U. S. Fish and Wildlife Service, Washington, D. C.), 1(3), July 1941, pp. 191-196.

Description of the types of traps used; with the best of them 731 turkeys were captured, only 5 of which died as a result of injuries received in trapping and handling. The methods of crating and transporting the birds also are noted. Pen propagation has been tried with variable results. Comment is made upon habitat improvement. The project has included work with both the Rio Grande and eastern subspecies of the wild turkey.

Management: Transplanting, mountain goat

Howard, L. J. Mountain goats moved to new home, U. S. Forest Service (Missoula, Mont.) Northern Region News, June 6, 1941, pp. 27-28 (mimeographed).

Trapped in a corral, the gate of which was operated by a wire pulled from a distance; bait salt. Twelve animals were captured, crated, and transported by truck. Weights of yearlings were from 40 to 60 pounds and of adults, 100 to 142.

Management: Turkey

Blakey, Harold L. Status and management of the eastern wild turkey, American Wildlife (American Wildlife Institute, Investment Bldg., Washington, D. C. 25 cents a copy), 30, No. 3 (Final issue), Oct. 1941, pp. 139-143, 2 photos.

Depletion of the wild turkey population has gone so far that the birds now "occupy less than 1 acre for each 100 acres on which they could be sustained" and the outlook for some of the remnant bands is discouraging. Favorable conditions that have long preserved the birds in South Carolina are now changing for the worse. The author describes management for perpetuation of the pure strain of native wild turkey on Bull's Island, S. C., and states that there is a "good" stock on the Kentucky Woodlands National Wildlife Refuge. A bill to establish a Federal refuge especially for the wild turkey has been introduced in Congress. Eighteen States have undertaken Federal aid projects for the benefit of the birds. Suggestions for turkey management are made. Acreages should be ample and cover, open. The use of controlled fire in the South is the most effective and economical tool for conditioning the environment. National forests are suggested as desirable areas for turkey management, but foresters probably will not adopt the author's burning policy. Much is being said nowadays about the excellence of the wild turkey stock of the Santee Region, S. C., but little or nothing about the man who did most to bring that excellence to attention and who made disproportionate sacrifices to arouse interest in its preservation. In these connections, the name of George E. Malamphy, of Wildwood, Cumberland, Md., should not be forgotten.

Management: Water holes

Allan, Philip F. Fence good conserver of soil and life, Western Farm Life (1520 Court Place, Denver, Colo.), 43(18), Sept. 15, 1941, pp. 4, 21, 2 photos.

Fencing off gullies and water holes by protecting the vegetation around them from livestock is a boon to wildlife. Examples are given of beneficial results.

Management: Wildlife on public lands

Cline, Justus H. Administration of public lands, Trans. Sixth N. A. Wildlife Conference 1941 (American Wildlife Institute, Investment Bldg., Washington, D. C. $1.00 a copy), pp. 72-76.

There has been too much division of authority and too little consideration of the common end, which is preservation and improvement of man's environment. Wildlife in almost the entire United States "is like the man without a country. The landowner owns the land, the habitat, the food supply. The state, according to legal theory, owns the wildlife. If the landowner cuts down the trees that bear the nuts so necessary to squirrels, trees in which these animals den and rear their young, the poor creatures do not have a legal protector in the world to whom they can appeal. So with wildlife in general--it is in an utterly impractical and impossible situation as far as effective conservation is concerned." The writer discusses two plans for improving the situation that have been tried in Virginia. In one, the State, by legislation, granted to the Federal government all wildlife rights in a certain area in the George Washington National Forest. In the other, cooperative wildlife management, also authorized by law, between the State Game Department and the U. S. Forest Service was tried on two national forests.

Both plans worked well but the second is considered preferable. The extension of cooperative wildlife management to private lands is suggested.

Management: Winter feeding

Grange, Wallace B. Feeding wildlife in winter, U. S. Dept. of the Interior Conservation Bul. 13 (Supt. of Documents, Washington, D. C. 10 cents a copy), 20 pp., 9 figs., 1941.

Supersedes U. S. D. A. Farmers' Bulletin 1783; gives suggestions for feeding upland game and other land birds, waterfowl, small mammals, and big game.

Management: Winter feeding

Hicks, Lawrence E. Emergency feeding of game and song birds in winter, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 154, 10 pp. (mimeographed), Dec. 1940.

The effects of clearing and cultivating upon birds and the desirability of modifying farm practice to aid them in winter are discussed. Methods suggested include: leaving standing corn, leaving shocks in the field, and feeding from shelters, and in other ways. There is a diagram and instructions for preparing permanent winter feeding shelters for wildlife. Attention is given also to attracting and feeding song birds. A list of birds occurring in Ohio in winter is presented with notes on foods likely to attract each of them. Bibliography of 42 titles.

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WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
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BY THE FISH AND WILDLIFE SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

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SPECIAL NOTICES

Back copies of WILDLIFE REVIEW are in constant demand by those trying to complete sets and any contributions will be welcome. If desired, we shall be glad to send franks so that copies may be returned without payment of postage. The following tabulation lists issues for which we now have requests; gifts of these will be especially appreciated:

No. 2 (3)	15 (1)	25 (4)
3 (5)	22 (2)	26 (1)
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Regrettably the preceding issue was erroneously numbered 31 on the cover, though correctly numbered 32 in the running heads of the pages. To avoid confusion, please change the cover number to 32.

Washington, D. C. No. 33 December, 1941

Conservation

Preble, Edward A. Wildlife conservation--1941 brand, Nature Magazine (1214 Sixteenth St., N. W., Washington, D. C. 35 cents a copy), 34(7), Aug.-Sept. 1941, pp. 391-395, 404, 406, 1 table.

As a keynote, the author quotes J. N. Darling to the effect that, "what we have been doing is not wildlife conservation, since we continue to have less instead of more." He then calls in turn upon the writings of Edward H. Forbush, W. T. Hornaday, Emerson Hough, and Zane Grey for remarks which show that all of these authors were pessimistic as to the course of conservation in this country. He also refers to the great growth in the number of hunters and points out that they "are pursuing a remnant of game so pitifully reduced that the mind of the naturalist recoils from the task of discussing it." Attention is then given to each of the principal Federal moves in the direction of wildlife conservation, their advantages and disadvantages, in the view of the author, being enumerated. The work of four leading unofficial conservation organizations is commented upon. The tone of the article in general is critical and far from hopeful. The author believes "that it is folly to continue to assume that our diminishing stocks of game birds can still furnish sport for the increasing hordes of gunners" or that through licenses and taxes upon hunting it, wildlife can be made to pay for its own salvation.

The table shows the number of hunting licenses issued by Alaska and the States in certain years from 1911 to 1939 and of duck stamps sold in 1935-36 and 1939-40. Increase in the latter nearly three-, in the former nearly fivefold.

Conservation

Preble, Edward A. Our endangered game birds, Nature Magazine (1214 Sixteenth St., N. W., Washington, D. C. 35 cents a copy), 34(9), Nov. 1941, pp. 513-518, 523-524, 2 photos.

The author concludes that most conservation books "emphasize the methods that are popular with gunners" and gloss over the fact that "a number of species of our game birds x x x are becoming dangerously scarce." Various ducks, geese, and grouse are being kept on the game list without any reliable evidence that such action is justified. The past and present statuses of several of these birds is discussed, as are also those of the woodcock, Wilson's snipe, and doves. The author believes that we are pursuing the same course that has resulted in extermination of species in the past and that, unless abandoned, it will have the same effect upon various other species now evidently endangered. A terminal tabulation records the approximate number of hunters and lists the principal species of game in each State.

Conservation: Pan-American

Atwood, Wallace W. The protection of nature in the Americas, Instituto Panamericano de Geografia e Historia (Mexico, D. F., Mex.), Publ. 50, 93 pp., 30 pls., 3 folded maps, tables, 1940.

Report of a committee of the Pan-American Institute of Geography and History on national parks and other reservations of the Americas and the amenities they preserve. Measures other than the establishment of reservations for the protection of wildlife also are treated.

Diseases and Parasites: Botulism

Quortrup, E. R., and A. L. Holt. Detection of potential botulinus-toxin-producing areas in western duck marshes with suggestions for control, Journ. Bacteriology (Williams and Wilkins Co., Baltimore, Md.), 41(3), March 1941, pp. 363-372, 2 tables.

Report on studies of the Bear River Wildlife Disease Research Station, Utah. Bacterial action in decaying vegetation uses up practically all available oxygen, thus preparing the way for the anaerobic bacillus that produces the botulinus toxin. This finding pointed the way to a control measure that has been tested and found effective. Authors' summary: "The common aquatic and emergent vegetation as existing in western-duck-sickness areas may serve as an excellent medium for growth and toxin production of Clostridium botulinum type C. It was found that in only the growing stage would Salicornia rubra serve as a medium; the dry plant did not produce toxin. It is possible that the same may be true in other plants. Potential toxin-producing areas were demonstrated by use of the oxygen and the pH tests. Botulinus toxin was proved to be present in such oxygen-deficient areas. More experimental work, however, is required to determine the value of this test. Raking and aerating predetermined areas proved successful as control measures, as evidenced by a material reduction of sickness. Destructive action of aerobic bacteria on preformed botulinus toxin was demonstrated."

Diseases and Parasites: Cestoda, Anoplocephalinae

Stunkard, Horace W. Studies on the life history of the anoplocephaline cestodes of hares and rabbits, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(4), Aug. 1941, pp. 299-315.

Review of the literature (24 titles cited) as to occurrence of these parasites and their life histories. Account of experiments in Germany demonstrating the functioning of free-living mites as intermediate hosts.

Diseases and Parasites: Cestoda, Cladotaenia

Schmidt, Fred L. A new cestode, Cladotaenia oklahomensis, from a hawk, Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 59(4), Oct. 1940, pp. 519-522, 1 pl.

Description, measurements, and illustrations; from red-tailed hawk, Oklahoma. Bibliography of 5 titles.

Diseases and Parasites: Cestoda, Cochoristica

Loewen, S. L. On some reptilean cestodes of the genus Cochoristica (Anoplocephalidae), Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 59(4), Oct. 1940, pp. 511-518, 1 pl.

Report on one unidentified, and 3 named species, 2 of the latter described (and illustrated) as new, from a lizard (Kansas) and a rattlesnake (Texas). Their relationships are discussed and synonymy is given for 4 other species. Bibliography of 13 titles.

Diseases and Parasites: Encephalitis

Anon. New developments in knowledge of encephalitis, Journ. Amer. Medical Assoc. (535 North Dearborn St., Chicago, Ill. 25 cents a copy), 117(16), Oct. 18, 1941, pp. 1361-1363.

Review of 9 recent papers. In Russia ticks, and in the United States mosquitos, have been demonstrated to transmit the disease. It is primarily one of wild mammals and birds, several of which are mentioned in this account

Diseases and Parasites: Salmonella

Edwards, P. R., and D. W. Bruner. A new Salmonella type, Salmonella illinois, Proc. Soc. Experimental Biol. and Medicine (Utica, N. Y. $1.00 a copy), 48(1), Oct. 1941, pp. 240-242, 1 table.

From Hungarian partridges, Michigan, and turkeys, Minnesota; original description, comparison with other types.

Diseases and Parasites: Trematoda, Alaria

Odlaug, Theron O. Morphology and life history of the trematode, Alaria intermedia, Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 59(4), Oct. 1940, pp. 490-510, 3 pls., 1 table.

Description and illustration of the stages in the life history and account of experimental demonstrations of their sequence. The parasite inhabit successively, snails, tadpoles and frogs, mice or rats, and cats or dogs. Pathology and taxonomic relationships are discussed. Bibliography of 29 titl

Diseases and Parasites: Trematoda, Echinochasmus

Beaver, Paul C. The life history of Echinochasmus donaldsoni n. s a trematode (Echinostomidae) from the pied-billed grebe, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 27(4), Aug. 1941, pp. 347-355, 1 p

Description and illustration of all stages of the parasite; intermedi hosts, snails and fishes; Michigan. Bibliography of 13 titles.

Diseases and Parasites: Of raccoon

Morgan, B. B., and E. F. Weller, Severe parasitism in a raccoon (Procyon lotor lotor, Linnaeus), Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 59(4), Oct. 1940, pp. 523-527.

Account of a specimen from Iowa that was infested by one species each of louse, flea, tick, coccidia, cestode, and trematode, and two of nematodes. These parasites are named and annotated. Bibliography of 11 titles.

Food Habits: Bird enemies of wasps

Rau, Phil. Birds as enemies of Polistes wasps, Canadian Entomologist (Prof. R. H. Ozburn, Ontario Agricultural College, Guelph, Ont., Canada), 73(10), Oct. 1941, p. 196.

Summer tanager feeding on larvae of 2 species at Gray's Summit, Missouri.

Food Habits: Of rail, clapper

Moffitt, James. Notes on the food of the California clapper rail, Condor (J. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 43(6), Nov.-Dec. 1941, pp. 270-273, 1 table.

Report on analyses of 18 stomach contents by the Fish and Wildlife Service. The animal:vegetable ratio of the food was approximately 85:15. The plant element was entirely seeds of marsh cordgrass (Spartina leiantha). The animal portion was largely mollusks, and chiefly of a single introduced species (Modiolus demissus). The analyses are separately tabulated, percentages by bulk of each food item being given. Ecological differences, perhaps in food supplies, may account for the irregular distribution of this rail in the San Francisco Bay region.

Life Histories: Cotton rat

Patton, C. P. Some facts about cotton rats and their relation to quail, North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh, N. C.), 5(11), Nov. 1941, pp. 10-11, 15, 1 photo.

Cotton rats thrive in dense ground cover, particularly that provided by the so-called broomsedges (Andropogon), but their populations are subject to cyclic decimation (4-5 year period). Their food habits make them inimical to quail, both as predators on eggs, and competitors for mast and legumes. Predacious species, attracted by abundance of cotton rats, may incidentally damage quail. Reduction of the numbers of these rodents is indicated as the best means of stopping this casual predation. Destruction of cover by controlled burning is an effective way of combatting cotton rats.

Life Histories: Moose

Manweiler, J. The future of Minnesota moose, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 3(15), Dec. 1941, pp. 38-43, 2 photos.

Notes on the classification and distribution of American moose; description of the animal and its habits; habitat preferences; and food requirements (10 kinds of browse, herbs, mosses, lichens, liverworts, and 7 groups of aquatic plants mentioned). "Minnesota's moose population apparently has not increased since the hunting season was closed in 1922." Unfavorable factors, including parasites, are discussed. Poaching, often from the lust to kill, no use being made of the carcasses, is a serious drain upon their numbers. Protection of range and preservation of habitat may save a remnant.

Life Histories: Prairie chicken, Attwater's

Lehmann, Valgene W. Attwater's prairie chicken; its life history and management, U. S. Fish and Wildlife Service, N. A. Fauna 57 (Supt. of Documents, Washington, D. C. 40 cents a copy), 66 pp., 14 pls. (1 col.), 4 figs., 15 tables, Nov. 1941.

A thorough study from the management point of view, treating former and present distribution and abundance, habits, habitat requirements, limiting factors, and management. There is a summary, bibliography of 28 titles, and a brief index. Author's abstract: "Attwater's prairie chicken, a characteristic bird of the Texas coastal prairie, is closely related to the now extinct heath-hen of northeastern North America. Once abundant in an area extending from the coastal tall-grass prairies of southwestern Louisiana and Texas west and south to near Port Isabel, it has decreased in numbers as man has exploited its habitat, until now it is threatened with the same fate as that of the heath-hen. Important factors limiting the numbers of the bird include excessive or persistent rainfall during the nesting season, heavy grazing, excessive pasture burning, agricultural operations, and overshooting. Management will usually involve protection from excessive killing, improvement of food and cover, and control of predators and of the kill by hunters. Responsibility for this rests with the landowner. Optimum prairie chicken range apparently consists of well-drained grassland, with some woods or shrubs, the cover varying in density from light to heavy; and with surface water available in summer; diversification within the grassland type is essential. In the absence of ample refuges for the species, probably all other favorable factors together will fail to save Attwater's prairie chicken from extinction."

Life Histories: Starling

Brockenridge, W. J. The starling, an undesirable alien, Conservation Volunteer (Minnesota Dept. of Conservation, St.Paul), 3(15), Dec. 1941, pp. 10-13, 1 fig.

Discussion of the unfortunate results of introductions of the European rabbit into Australia, mongoose in Jamaica, and rat universally. History of the colonization and spread of the starling, description of its recognition marks and habits, and suggestions as to control.

Natural History: Animal behavior

Walker, Ernest P. Animal behavior, Smithsonian Institution (Washington, D. C.), Ann. Rep. 1940, pp. 271-312, 18 pls., 1941.

General account combining information from literature with that gleaned by the author in the field, and from observations on home pets and on animals in the National Zoological Park.

Natural History: Big game, Montana

Koch, Elers. Big game in Montana from early historical records, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 357-370.

Author's abstract: "A description of big-game occurrence and abundance in Montana since the coming of the white man, based on journals and accounts of a large number of the early explorers and fur-traders, especially Lewis and Clark, David Thompson, Alexander Ross, Ross Cox, Maximilian Prince of Wied, Captain Raynolds, Captain Mullan, and others. Describes the vast herds of game on the Missouri and Yellowstone, but brings out the relative scarcity of game in the heavier-timbered parts of western Montana and Idaho. Distribution of elk discussed, especially their notable lack in extreme western Montana and west of the Bitterroot Mountains in Idaho. Attacks theory of some naturalists that present game herds in Mountains are a remnant driven back by settlement from the valleys. Evidence is presented to show that the early explorers found more game in the mountains than now occurs there. Game in the valleys and plains was killed off, but the rough mountain country continues to give refuge to game animals already there, although elk particularly have been forced to winter at higher elevations than they did before settlement."

Natural History: Big game and fur animals of Maine

Aldous, C. M., and H. L. Mendall. The status of big game and fur animals in Maine, Maine Cooperative Wildlife Research Unit (Orono), 24 pp. (mimeographed), 15 maps (lithoprinted).

Brief popular accounts of the species, treating the history, distribution, and habits of each; the maps indicate present and former ranges and the numerical status of the animals.

Natural History: Birds of Wyoming

McCreary, Otto. Wyoming bird life (Burgess Publishing Co., Minneapolis, Minn. $2.00 a copy), Revised Edition 1939, 124 pp. (processed).

Annotated list of 358 species and subspecies. Five and one-half page bibliography.

Natural History: Mammals of Illinois

Necker, Walter L., and Donald M. Hatfield. Mammals of Illinois. An annotated check list with keys and bibliography, Bul. Chicago Acad. Sci. (Chicago), 6(3), pp. 17-60, 15 figs., May 1941.

The characters cited in the keys are illustrated; there is a glossary of terms; and locality records for all but the most widespread species. Bibliography of 8 general, and 45 Illinois, titles.

Natural History: Mammals of Ohio

Katz, David T. A key to the mammals of Ohio, Ohio Wildlife Research Station (Ohio State Unuversity, Columbus) Release 158, 34 pp., figs. (mimeographed), June 1941.

Illustrated key and list of species with indication of their distribution and habitat. Glossary of terms used; lists of extirpated, prehistoric, and introduced species; and bibliography.

Natural History: Plants of Arizona and New Mexico

Tidestrom, Iver, and Teresita Kittell. A flora of Arizona and New Mexico (Catholic University of America Press, Washington, D. C. $6.00 a copy), xxvi+897 pp., 1 folded map, 1941.

Keys, brief descriptions, and statements of distribution for nearly 4,000 species of flowering plants and ferns.

Natural History: Rabbits, Washington

Dalquest, Walter W. Distribution of cottontail rabbits in Washington State, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 408-411, 2 figs.

Author's abstract: "The native cottontail rabbit (Sylvilagus n. nuttallii) occupies the State of Washington east of the Cascade Mountains and south of the Columbia River, extending west to Grand Dalles in the Columbia River Valley, north to Canada in the Okanagan River Valley, and north Colvill in the northern Columbia Valley. Eastern cottontails (Sylvilagus floridanus alacer, mearnsi, and similis) have been introduced in Whitman, Clark, King, and Island counties. The introduced rabbits have increased and spread over much of the State. The pigmy rabbit (Sylvilagus idahoensis) seems restricted to Grant and Adams counties in eastern Washington."

Natural History: Snakes of Colorado

Jones-Burdick, W. Harry. Guide to the snakes of Colorado, Univ. of Colorado Museum (Boulder), Leaflet 1, 11 pp., 6 figs. (on cover), Feb. 1939.

Key, descriptions, and general notes for 28 species and subspecies.

Natural History: Wild ducks

Sheldon, H. P., and Frederick C. Lincoln. Wild ducks (American Wildlife Institute, Investment Bldg., Washington, D. C. 25 cents a copy), 36 pp., 16 pls. and covers (1 a map), colored.

The authors' contributions are distinct. Sheldon's entitled, "Two families" traces relationships between waterfowl and men through the ages, including man's efforts to understand and utilize, yet conserve, the birds. Lincoln's essay on "The waterfowl flyways" delineates the summering and wintering territories and principal migration routes of the wild fowl. A foreword on waterfowl status and conservation is by Ira N. Gabrielson. The colored illustrations by Fred Everett are accompanied by small maps showing breeding and wintering ranges of the birds, and by brief descriptive and life-history notes.

Natural History: Wildrice

Moyle, John B. Minnesota's wild rice crop, Conservation Volunteer (Minnesota Dept. of Conservation, St. Paul), 3(15), Dec. 1941, pp. 30-32.

Range of the plant in the United States and in Minnesota; life history; methods of harvesting by Indians; legislation in Minnesota protecting the plant and regulating gathering of the rice; the retail value of the annual crop of the State is about $400,000. In 1925, $125,000 worth of wildrice was harvested on Lower Rice Lake, Clearwater County.

Predators: Dog

Armfield, R. B. An all important wildlife conservation problem, North Carolina Wildlife Conservation (Division of Game and Inland Fisheries, Raleigh, N. C.), 5(6), June 1941, pp. 10-13.

There are 600,000 dogs on North Carolina farms, of which at least 500,000 are permitted to run free all the time. This is one dog to each 40 acres of agricultural land. These dogs destroy game that is worth far more than they are; estimates are given. Solution of the problem should be earnestly sought at once.

Propagation: Bob-White

Nestler, Ralph B., and W. W. Bailey. Bobwhite quail propagation, U. S. Dept. of the Interior Conservation Bul. 10 (Supt. of Documents, Washington, D. C. 10 cents a copy), 50 pp., 43 figs., tables, 1941.

Description chiefly of modern commercially feasible methods, employing incubators and brooders or brooder houses. Incidental attention is given to the use of bantam foster mothers. Section heads indicating the nature of the contents are: Selection of breeders; housing and equipment; care of the birds including incubation, brooding, holding during winter, correcting deficiencies of diet; disposal of stock; winter care of liberated birds; and general precautions. Photographs, plans, and bills of material of all the principal items of equipment are presented. Remedies for diseases and vices are suggested.

Propagation: Irradiation results, pheasants

Bissonnette, T. H., and A. G. Csech. Light-induced egg-production in large pens followed by normal nesting in pheasants, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 383-389, 1 pl.

Authors' abstract: "Mongolian (Phasianus colchicus mongolicus), ringneck (P. c. torquatus), and black-neck (P. c. colchicus) pheasants were night-lighted, Jan. 3-April 25, in pens 12' x 12', without cover, then returned to normal days and cover. Controls, without lights, but with cover throughout, began laying about April 5. Experimental birds beginning Feb. 20, 19, 13, averaged 0.762, 0.491, 0.525 eggs per hen-day, respectively, to April 25, with fair fertility. All groups laid eggs in depressions in snow even when birds froze into ice on the floors at night, requiring breaking out next morning. Severe weather reduced laying but did not stop it. Weather is, therefore, a factor in later stages of egg production, not in fundamental activation. On return to normal days and cover, laying was maintained for 7, 9, 7, days, respectively. dropped off temporarily and was resumed at a slower rate. Nests made were 0, 2, 1, as compared with 2, 0, 1, respectively, last year. Mongolians were best layers, most affected by reduced lighting, recovered laying best, but made no nests; ringnecks, poorest layers, least affected by reduced lighting, second best in recovery, made two nests. Eight hens per cock can be lighted effectively in such pens for early eggs, then 'planted' in the wild in April with prospects of broods, produced without further cost."

Propagation: Pheasant starting rations

Stadelman, W. J., R. R. Murphy, E. V. Callenbach, and R. V. Boucher A comparison of pheasant starting rations under practical commercial conditions, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 12(5), Aug. 1941, pp. 4-5, 28-29, 3 photos, 9 tables.

Experiments with rations in which protein was partly supplied by soybean oil meal or by meat scraps alone supplemented or not by hard-boiled eggs and lettuce; and also with a commercial starting mash, with and without the

supplement. The conditions and results of the tests are described and tabulated, and a summary given. All of the mash mixtures were found satisfactory in producing six-week old pheasants. Comparisons of costs are given. The supplements, while increasing costs, apparently had no effect on the quality or quantity of birds produced.

Propagation: Vices, nose picking

Bass, Charles C. Control of "nose-picking" form of cannibalism in young closely confined quail fed raw meat, Proc. Soc. Expt. Biol. and Med. (A. J. Goldforb, College of the City of New York. 75 cents a copy), 40(3), March 1939, pp. 488-489.

Nose picking is a vice that develops in brooders. It can be controlled by giving the quail chicks all the raw meat they will eat, withholding other food temporarily when necessary.

Research: Blood counts

Wetmore, Psyche W. A direct method of determining the erythrocyte, leucocyte, and thrombocyte count of fowl blood, Science (Lancaster, Pa. 15 cents a copy), 92(2391), Oct. 25, 1940, p. 386.

A staining method, and the appearance of blood elements differentiated by it are described.

Research: Cooperative

Couch, Leo K. Cooperative Wildlife research, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 12(8), Nov. 1941, pp. 6-7, 28, 4 photos.

Six years of Federal-State cooperative research in wildlife management have been completed. The States, supporting institutions, and dates of beginning are listed for the 11 existing units. Organization of the work, attention given to research and management problems, and application of the findings are outlined. Under the Forest Research Act, further wildlife work is being carried on at 7 Forest Experiment Stations. Objectives are set forth.

This is a reprint of a talk given at the in-service training school of the Fish and Wildlife Service, Patuxent Research Refuge, Md.

Research: Cover values

Leedy, Daniel L. Ohio pheasant production in relation to agricultural land-use, 1940, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 153, 31 pp., 25 tables, 4 graphs (mimeographed), Dec. 1940.

Essentially a report upon hay and grain crops as nesting cover and the success of pheasant reproduction in them. Hay fields contained more nests

(33.4 percent of all) than any other single cover type. They numbered 16.8 nests to each 100 acres. Sixty-five percent of those nests were destroyed by mowing. Similar data are given for other covers. Bibliography of 20 titles.

Research: Life histories

Odum, Eugene P. Technics in life history study, Oriole (Georgia Ornithological Society, 1174 Greenwich Ave., Atlanta, Ga.), 6(3), Sept. 1941, pp. 29-35.

The author points to need for life history studies; suggests southern species in need of attention; discusses general methods of observing, making notes, marking birds, and taking photographs; gives an outline in the form of 21 brief paragraphs to show the possible scope of such studies; and adds a classified bibliography of 36 titles.

Research: Preparation of material

Whitmore, George. Preparation of material for a laboratory diagnosis, M. S. C. Veterinarian (East Lansing, Mich. 35 cents a copy), 1(1), Fall 1940, pp. 8-9.

Suggestions as to parts of a carcass to submit for examination, as to preventing putrefaction, preparing samples of blood and feces, and making smears of various kinds.

Research: Scat analysis

Scott, Thos. G. Methods and computation in fecal analysis with reference to the red fox, Iowa State College Journ. Science (Ames, Iowa), 15(3), April 1941, pp. 279-285, 1 table.

Author's summary: "Foods of known weights and kinds were fed to red foxes for the purpose of testing methods of analysis and computation as applied to fecal material in food-habits research. The following methods of analysis with various computations were tested: (1) Numerical record of individuals; (2) frequency of occurrence; (3) dry weight; and (4) volumetric. The frequency of occurrence method was shown to provide for the most reliable interpretation of the relative quantities of foods consumed. A proposal was made for improvement of the results in the frequency of occurrence analysis b group treatment of the food items identified in such sequence that no group o item should possess greater potential for scoring occurrences in the same pas sage than those with which it is contrasted. The possibility of developing conversion factors for each food group or item for application to frequency indices in determining relative amounts was suggested. A technique for calculating the relative numbers of individuals represented in the frequency of occurrence analysis was discussed."

Research: Trapping and tagging deer

McBeath, Donald Y. Whitetail traps and tags, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 10(11), Oct. 1941, pp. 6-7, 11, 2 photos, 1 map.

Description of the traps used and experience with them; 607 deer have been caught (194 repeaters); only one out of every 40 was injured; a map shows points of recovery of tagged deer, all within 15 miles of place of release.

Research: Trapping and tagging skunks

Crabb, Wilfred D. A technique for trapping and tagging spotted skunks, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 5(4), Oct. 1941, pp. 371-374, 4 pls., 5 figs.

Author's abstract: "A box trap has been devised for catching Spilogale interrupta that can not be prematurely tripped by wind, snow, ice, or water. It provides protection for the trapper from being scented and for the captured animal from the weather. Also an apparatus has been invented for handling and ear-tagging this skunk. It is primarily a narrow wooden passageway in the dark interior of which the animal may be crowded. A leather loop is provided for holding the head while ear-tagging. A plate glass window permits observation of sex and condition."

Weights and measurements: Deer

Pierle, C. B. West Virginia deer weights and measurements, West Virginia Conservation (Charleston, W. Va. 10 cents a copy), 5(5), Aug. 1941, pp. 10-13, 21, 2 tables.

The data are recorded in the tables. The author's conclusions about them are: "In an examination of 10 deer on Cooper's Rock State Forest and of 25 kills on Seneca State Forest, it was found that those on Cooper's Rock were consistently larger than deer taken on Seneca. The explanation lies partly in the fact that a smaller type deer originally was stocked on the latter. It is also noted that weights of deer killed the past three years on Seneca State Forest have been gradually decreasing, indicating that a greater percentage of younger bucks are being killed, which in turn, indicates a condition of overhunting."

WILDLIFE LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C.

192. Selected publications on waterfowl and gallinaceous game birds, by Myer Katz, 42 pp., July 1941.

Bibliography of official and other bulletins, books, and periodicals, American and foreign, with addresses of their publishers. There is also a list of 8 finding indexes and abstracting publications and a subject index of the leaflet itself.

193. Directions for collecting materials for food habits studies, 7 pp., 1 pl., July 1941.

Remarks on the requirements of good collecting; statement of equipment needed; and suggestions as to the preparation, labelling, and preservation of material representing different classes of vertebrates. Use of the tags and schedules provided by the Service and directions for shipping.

194. Publications on trapping, 2 pp., July 1941.

Bibliography of available official documents and other pertinent publications, both American and foreign, with the addresses of their publishers.

195. Directions for poisoning thirteen-striped ground squirrels, 2 pp., July 1941. Supersedes Leaflet Bi-1162, 1931.

Formula for baits and directions for their use.

196. The status of migratory game birds: 1940-41, 28 pp., 1 map, 3 tables, July 1941.

Account of the investigations of the flyway biologists on breeding and wintering grounds and of the January inventory of waterfowl; discussion of the status of certain shore birds and doves, and of rails and coots. The least optimistic of this series of reports. Final conclusion: "Apparently there must be renewed emphasis upon conservation measures."

197. Directions for controlling tree squirrels, 2 pp., August 1941.

Cautions as to legal protection of squirrels; when control is necessary and authorized, it may be accomplished by repellents, traps, and guns, the use of which is discussed.

198. Raising muskrats, 2 pp., August 1941.

Muskrats cannot be profitably raised in small pens. Directions are given for marsh management, also brief notes on the breeding habits of the animals. The taking of only prime pelts is urged.

199. Abstract of fur laws, 1941-42, 40 pp., September 1941.

The Federal Lacey Act as bearing on fur law violations. Abstract of provisions as to open and closed seasons, possession and sale, shipment and

export of furs, and licenses for the Usonian States, Canadian Provinces, and Newfoundland. Addresses are given of officials from whom information on fur laws can be obtained in all of the commonwealths concerned.

200. Annotated list and index of Wildlife Leaflets 101 to 200, by W. L. McAtee, 20 pp., October 1941.

Nature of the series; brief abstract of each leaflet; author and subject indexes.

NOTES AND NEWS

Some readers may be interested in an extensive publication on the "Peat resources of Alaska" by A. P. Dachnowski-Stokes (U. S. Dept. Agr. Tech. Bul. 769, 84 pp., 24 figs., 2 tables, 1941. Supt. of Documents, Washington, D. C. 15 cents a copy). All of the matter on wildlife is here quoted: "Information on the wildlife of muskegs and the interrelationships between animals and vegetation is very limited. Muskegs show as yet no effect of grazing or the feeding by game and herbivorous fur bearers. There are signs of browsing on tree seedlings and twigs of low deciduous shrubs, and of feeding on berries and other fruits. There is an abundance of shelter and food but, except in southeastern Alaska, the supply may be inaccessible during the long winter months owing to heavy snowfall. Excavated areas of peat, if not used for agricultural purposes, should be ponded and reserved for wildlife."

The U. S. Bureau of Standards has issued "Rules for electric fences," as Handbook H36. This is part 6 of the new edition of the National Electric Safety Code, revision of which is nearly completed. The new handbook gives the requirements for making the use of electric fences as safe as possible. Four types of controllers are recognized: battery, alternating current, inductive discharge, and capacity discharge. Other requirements deal with measurement of output, marking, grounding, and insulation tests. Available for 5 cents from the Supt. of Documents, Washington, D. C.

The Proceedings of the Second Park Naturalists' Conference held at Grand Canyon National Park, November 13-17, 1940, has been published in mimeographed form (National Park Service, Washington, D. C. vi+367 pp., 2 pls., 1941). It reproduces 37 papers with discussions upon them and accessory materials, but is not available for general distribution.

"Farm woods: their importance and control" (Va. Polytechnic Inst. (Blacksburg) Bul. 34(14), Aug. 1941, 120 pp., 66 figs.), by A. B. Massey, contains far more references to wildlife than is usual with publications on its subject. A paragraph in the introductory pages and numerous remarks in the legends of illustrations comment on the value of woods to wildlife.

"A symposium on hydrobiology," by 52 contributors contains 32 papers, and abstracts of 16 others, delivered at the University of Wisconsin in the autumn of 1940. Among them are contributions dealing not only with the biological aspects of the subject, but with the environmental factors that affect aquatic life. The book of 405 pp. is available from The University of Wisconsin Press (811 State Street, Madison) at $3.50 a copy. A chapter by Neil Hotchkiss, "The limnological role of the higher plants" (pp. 152-162), discusses among other properties their value as cover and food for wildlife, and includes a bibliography of 43 titles.

An exchange of letters from H. H. Chapman (pro) and H. N. Wheeler (con) on Controlled Burning was published in the Journal of Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), Vol. 39, No. 10, October 1941, pp. 886-891. There is little evidence of approach to a common ground in this field that is of such great importance to wildlife managers.

Ciencia. Revista hispano-americana de ciencias puras y aplicadas (Editorial Atlante, S. A., Calle de las Artes, No. 58, Mexico, D. F., Mexico. Monthly, $3.00 per year), devoted to the promotion of scientific relations between the United States and the Spanish-speaking nations, is now in its second volume. It publishes original articles, and reviews books and periodical literature. The issue seen (2(1), January 1941) consists of 48 plus 4 (advertising) pages and cover. Except for certain references in English, the text is entirely in Spanish.

Abstracts of Russian articles bearing on wildlife management, seldom appearing in WILDLIFE REVIEW, may be found in Biological Abstracts (University of Pennsylvania, Philadelphia, Pa.), notably in the recently issued Volume 15, part 8, Oct. 1941, and part 9, Nov. 1941.

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The classification used in the index is primarily from the wildlife management point of view, major headings being much the same as have been regularly used in WILDLIFE REVIEW. Subordinate grouping depends usually on the key word, which may be preceded by a preposition, article, or other trivial term. Federal agencies are arranged alphabetically under U. S. Government.

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